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RETROSPECTIVE COMPARATIVE ANALYSIS OF NEW ENERGY TECHNOLOGIES AND ENERGY LAW IN SUSTAINABLE DEVELOPMENT

Submission Date: December 09, 2023, **Accepted Date:** December 14, 2023,

Published Date: December 19, 2023

Crossref doi: <https://doi.org/10.37547/ijlc/Volume03Issue12-09>

Olim Kh. Narzullaev

Doctor In Law, Professor, Department Of Ecological Law Tashkent State University Of Law, Uzbekistan

ABSTRACT

Energy production is a necessary means of human existence and development, affecting nature and the natural environment. The study and comparative analysis of the energy sector from the point of view of jurisprudence is important in ensuring sustainable development. In this regard, it is important to study the experience of developed countries and the legal traditions of our national statehood. Of particular importance is the development and research of new energy technologies and energy law, innovative technologies, comparative analysis of its legal basis, the study of scientific foundations.

KEYWORDS

Sustainable development, legal education, science, improvement, energy charter, energy strategy, innovation, trend, energy law, alternative energy, renewable energy, solar energy, wind energy, geothermal, hydropower, biogas, biomass, collider, nuclear energy, thermonuclear, nuclear fuel, biodiversity, biological resources, international energy law, ecology, environmental sustainability, ecological security, biological diversity, biological resources, water, flora and fauna, natural resources, genetic engineering.

INTRODUCTION

The introduction of effective technologies is of particular importance in the history of civilization. The 20th century is recognized by the enormous growth of energy needs of mankind in various forms. This trend continues in the 21st century. It should be recognized that energy workers have been fulfilling their historical task of ensuring the development of human civilization. At the same time, the responsibility of

energy workers to the society, current and future generations is increasing more and more.

The development of the country is closely related to the extent to which the country is provided with energy (natural) resources. Coal, oil, natural gas, peat, wood, shale, water, electric and nuclear energy, wind and solar energy are energy resources.

The problem of energy has many aspects, among which one of the most general aspects should be noted: energy (in the broadest sense) can be considered as the beginning of everything that exists. Everyone should understand the philosophy of energy. Energy permeates all spheres, our whole life is connected with energy. Energy is the ability to do something. And, energy consumption is a necessary condition of human life.

Nobel laureate, academician of the Academy of Sciences P.P. Kapitsa said: "The future of humanity depends on how it supplies itself with energy" [1] What is "energy"? This seems to be well known to all of us, as we use the word "energy" in our daily life and in scientific research. Do we always know what that means? And the most important thing is where it came from. energy is at the center of all social relations related to energy. "In the literature, the difference between power and energy is not given much attention" [2].

"Energy" - (from the Greek *energeia* - movement (actually) - a term of ancient Greek philosophy, meaning: 1) movement, implementation; 2) activity.

Quantitative measurement of the movement of particles that make up matter of any form, in particular, a body or a system of bodies, and the interactions of these particles and interactions with other particles [3].

Therefore, energy is a field of public economy, science and technology, which includes the generation of various types of energy, their transformation from one type to another, their transmission and delivery over a certain distance, their use in all areas, and the solution of theoretical and practical problems related to them. . "Energy should be considered as a separate field of

industry, and it should be understood as a generalized name of energy-related activities" [4].

It should also be noted that in the matter of energy and energy, one of the most important basic laws of nature; according to him, in any closed system, we must recognize that energy does not appear from nothing and does not disappear, but only changes from one type to another.

Sustainable development[5] and ecology Modern economic and, to a large extent, political life provides us with sufficient[6] "evidence materials", vivid examples of the influence of energy on the multifaceted spheres of the world. The phrases "Energy Policy", "Energy Charter", "Energy Strategy", "Energy Security", "Energy Diplomacy", "Energy (Energy Efficient) Economy", "Collider" [7] are not only on the pages of daily newspapers and well-known magazines, but also are included in the titles of monographic studies. Separate studies are also being conducted. In particular, according to scientists in the field of civil engineering, energy represents a certain property of matter - a condition for the implementation of useful work, entrepreneurship and other types of activities - the ability to create conditions. The supply of energy from the energy supply organization to the consumer can be carried out only if there is a connected network [8].

In the field of ecology, energy law, international normative legal documents and our national legislation [9], there are different views on the concept of "Energy resources" and "natural resources", these concepts are complex and ambiguous, and at the same time closely related. "Natural resources (socio-economically appropriated natural objects" [10]. Energy resources - coal, gas, oil and nuclear products - these are really important resources (it doesn't matter whether they are solid, liquid or gaseous). But, on the

other hand, electrical energy (also thermal energy) is a product of processing (fuel) such material.

Also, in hydroelectric power stations, the potential energy of the water behind the dam falls from the top and rotates the turbine blades, and electrical energy is generated through mechanical energy.

The first legal document in the history of energy and environmental law in general is the Edict "Prohibiting the Use of Coal for Residential Heating in London" adopted by King Edward in the 13th century. In Russia, the decision of Peter I "On the protection of forests and wildlife" was adopted[11]. In the territory of Uzbekistan, important environmental norms are defined in "Avesto".

Materials and methods. "Energy Law" subject in the Russian Federation (since 2001) at Moscow State University, Department of "Entrepreneurial Law" (U.F.N. P.G. Lakhno) [12]. At the Technical University of Berlin (Prof. F.Yu. Zecker), Ukrainian State Technical University.

The subject "Energy Law" has been taught for many years for students in law schools of many universities of the world. In some universities, master's programs in energy law are operating. For example, George Washington University Law School[13]. The Department of Ecology and Energy Law in the magistracy has been training mature specialists in this field for 40 years. Subjects such as "Energy law", "Energy and environment", "Natural resources law", "Solid and hazardous waste control", "Oil and gas law", "Nuclear energy law" are studied within this direction.

More than 50 subjects related to energy and environmental law are taught in the Master's Degree in Energy Law of the University of Vermont Law School in the USA, and it is one of the most advanced law schools

not only in the United States, but also in the world in this field.

Queen Mary University of London Law School is one of the UK's best energy law programs. This university's Law School Master's in Energy and Natural Resources Law offers many modules on energy law. Representatives of Exxon, British gas, Shell companies, famous in the field of energy business, participate in the training of these modules with their lectures.

Dr. Vinogradov S.V. The University of Denmark (Scotland) was founded in 1977 as a major in energy, petroleum and natural resources. 23 special modules that deepen knowledge in this field are conducted on the basis of subjects. More than 100 students study in this direction. In this field, this university has a number of experts from abroad. Including Asia, Latin America, Africa, southern Europe(14), CIS and others.

At present, there are controversial situations regarding energy (energy) as an object of law and its study, and it is being studied in various fields of law in developed countries. For example, if we focus on a single case, energy cannot be considered a commodity because it is a general quantitative measure of the patterns of motion of matter. Rejection of the material understanding of energy is determined by the impossibility of applying the property regime to this special object of civil law (N. Zaichenko) [15].

Energy cannot be understood as an ordinary material good. Energy manifests the property of materiality and expresses a certain materiality state (current voltage, water temperature). These features serve to ensure that people achieve useful results, perform various technical operations, create the necessary conditions for work and rest. Due to its physical properties, energy cannot be stored and stored in large quantities in warehouses and special containers like other goods.

Useful properties of energy are manifested in the process of its use and consumption. As a result of use, it is possible to specify the work performed or the technological operations performed. However, the energy itself is not transformed into some product or other form, but disappears. The fact that the energy is available and used is only reflected in the indicators of measuring devices[16].

R. Savatier, one of the foreign scientists, writes, "legally, energy can be expressed only in the form of obligation. It is something that is always defined by general characteristics, expressed only in the results of its use and sold according to the unit of measurement. As an essential aspect of an obligation, it can never be an object of property rights."

According to S.M. Korneev, energy is not constructed as an ordinary subject of the material world, it is a specific property of matter given a certain state (current pressure, water temperature, etc.). Energy cannot be considered as a simple object of the material world, as something in the body; it is a given property of a specific state of matter and matter (voltage, water temperature, etc.). This feature is found in the creation of necessary conditions (lighting, ventilation, heating, etc.) for useful work, people's work and leisure [17].

It should be noted that the Law of the Republic of Uzbekistan "On Electric Energy" contains clear information that only electricity and energy are "special goods". That is, electricity is a special type of commodity characterized by simultaneous generation and consumption.

However, M.M.Agarkov and S.M.Korneev argue that energy is not a commodity. It is an independent object of legal regulation. Energy is a general, collective, abstract concept. Energy just doesn't exist. Energy also cannot exist without its source and carrier. There are

different types of energy: mechanical, thermal, electrical, physical, chemical and many other types. It should not be considered only from the point of view of the Civil Code.

Energy is complex, cross-sectoral. Energy is also a material phenomenon (good). There are many types of energy in nature. However, today, relations can be regulated only in relation to the types of energy that are useful for humans, used by people in everyday life and professional activities, or, on the contrary, prohibited. Each form of energy has its own characteristics. They determine certain features in the legal regulation of use (safety requirements, maintenance of the energy sector, order and method of energy supply (transmission), determination of its quality, etc.). A characteristic feature of energy is its ability to change from one form to another, which also requires appropriate legal features in the regulation of energy relations.

There are three main concepts of energy: one of them considers energy as a specific commodity; the latter energy is a property of immaterial nature. Third scholars suggest considering energy as an independent object of legal regulation.

It should be noted that in order to determine the legal significance of relations in the field of energy, first of all, it is necessary to determine the scope of public relations that constitute the subject of energy law. It is the basis for determining public relations in the field of energy and legal regulation of relations in this field.

It should be noted that this issue has been raised several times in legal literature. The perspective of public relations in the field of energy is presented in the legal literature, that is, general social relations are connected with the "network" (energy) community.

Yu.O.Joraev energy right should be manifested in three qualities like other rights (for example, citizenship, labor). It is: 1) emerging legal network, 2) type of legal sciences; 3) appears in adjectives such as training course. In order to say with full confidence that energy law is a type of legal science and a course of study, it is necessary to pay attention to its status as a branch of law. If a particular branch of law is a fully formed and developing branch of law, then there can be no doubt that it is recognized as a legal discipline and course of study. It is possible to conditionally recognize a complex of legal institutes that are not formed as a branch of law as a type of legal science and an educational course. Therefore, the introduction of energy law as a separate educational lesson is not without great benefits [18].

V.F. Popondopoulo, looking at issues of energy law and energy legislation, considers energy relations as relations related to the production, transmission and consumption of energy, including electricity and its other forms[19].

V. F. Yakovlev, P. G. Lakhno stated that energy is a sector of the economy and the relations existing in this sector, including the search for primary sources, production, transmission (transportation), distribution and use (consumption) of energy) is the basis of the introduction of legislation on energy[20]. It should be noted that V.F. Yakovlev, P.G. Lakhno, the definition of the country's fuel and energy complex is given as a system of relevant energy sectors, enterprises and organizations, based on the unity of functions performed in the process of extraction (production), processing, transformation. Use, storage, transportation and distribution of energy carriers and energy resources, including the construction and use of energy facilities for the purpose of meeting the needs of the population and the country's economy

with energy resources, fulfilling international obligations and protecting the environment[21].

O.A. Gorodov stated that the main direction of the energy law subject area is the social relations developing in the energy sector. Energy resources, production, transmission and use of energy types, other relations arising in connection with the production and use of this type of energy, investment, environmental requirements and other issues related to security.

Thus, determining the scope of relations regulated by the norms of energy legislation, these relations, in particular, in relation to traditional, alternative (renewable) sources of energy, energy resources search, extraction, production, processing, delivery, storage, transportation we can say that it covers the relationships that arise.

Therefore, the central issue in modern energy law is the study of relations with traditional, alternative (renewable) energy sources.

Research results. In recent years, measures aimed at the rational use and production of energy in our country, and the rapid introduction of new technologies that save energy and resources have been implemented, significant reforms have been implemented, and legal foundations are being strengthened. In general, relations in the field of electricity and energy use and the creation of its legal basis started a new stage. More than 200 normative legal documents and standards are being developed and implemented. Completely new special regulatory legal documents have been adopted. For example, the Law of the Republic of Uzbekistan "On the Use of Renewable Energy Sources" dated May 21, 2019[23], the Law of the Republic of Uzbekistan "On the Use of Nuclear Energy for Peaceful Purposes" dated

September 9, 2019[24]. (28), Decision of the President of the Republic of Uzbekistan No. PQ-4779 of July 10, 2020 "On additional measures to increase the energy efficiency of the economy and reduce the dependence of economic sectors on fuel and energy products by attracting available resources", PQ of August 22, 2019 - Resolution No. 4422 "On rapid measures to increase the energy efficiency of economic sectors and the social sphere, introduce energy-saving technologies and develop renewable energy sources", Resolution No. 452 of the Cabinet of Ministers of the Republic of Uzbekistan dated July 23, 2020 "Renewable energy sources "Decision on measures of state accounting of devices and the energy produced from them" [25]. was accepted and implemented.

If we pay attention to the foreign experience in terms of legal documents, until now 50 countries of the world have adopted the law "On Alternative Energy Sources" and now relations regarding the use of alternative energy are legally regulated. Internationally, Germany's "Alternative Energy and Energy System Act"[26]. In China, the Law on "Alternative Energy Sources"[27]. Law "On Alternative Energy Sources" in Belarus, Law "On Alternative Energy Sources" in Ukraine[28]. In the neighboring countries, Kazakhstan has the Law "On Support of Alternative Energy Users", Tajikistan has the Law "On the Use of Alternative Energy", and Kyrgyzstan has the Law "On Renewable Energy Sources"[29].

Renewable energy is a source of energy derived from environmental energy flows. These include: solar, wind, water resources, geothermal resources, biogas obtained from industrial and municipal, agricultural waste.

Renewable energy potential. One of the important ways to reduce greenhouse gas emissions can be the use of renewable energy sources. The gross potential

of solar energy in Uzbekistan is more than 51 billion tons of oil equivalent. Based on these resources, according to experts' calculations, it is possible to produce 40 times more electricity than the electricity consumed in our country this year. In general, the presence of large potentials of QTEM in Uzbekistan serves the successful development of this sector, which allows to absorb a large part of this potential when an appropriate economic environment is created.

Sustainable development. The energy crisis of the 70s of the last century, which covered many countries of the world, was an invaluable lesson for our country. This reminded once again that reserves of fuel and energy resources will run out. The concept of sustainable development of the economy as "meeting the needs of the present generation without compromising the interests of the future generation" was formed.

Achievements in the development of the gas industry in the middle of the 20th century - active operation of gas and gas condensate deposits at low costs - led to an increase in the share of natural gas in the overall balance of energy resources consumption. Low gas prices in the domestic market, large-scale gasification led to a sharp increase in hydrocarbon production.

Solar energy. The climate and geographical conditions of Uzbekistan provide the opportunity to obtain electricity and heat energy from solar energy on a large scale.

Solar energy is a renewable energy source that has a bright future in terms of practical use, convenient and easy to use energy. The gross potential of solar energy in Uzbekistan is more than 51 billion tons of oil equivalent.

The weather in Uzbekistan is clear more than 320 days a year, and our country has an advantage over most regions of the world in terms of the number of sunny days throughout the year. The future of solar energy is bright in terms of its application, its resources and its simplicity.

The Law "On the Use of Renewable Energy Sources", the Law "On Water and Water Use", and the Law "On the Rational Use of Energy" regulate relations in the field of using a solar collector for hot water. The rules for using heat energy are important.

The conditions and existing opportunities created in Uzbekistan for the practical use of solar energy serve as a basis for using this region as an experimental area for the introduction of advanced technologies in this field not only in our republic, but also in the whole of Central Asia.

Taking into account the accumulated experience and continuing to carry out research and pilot-industrial development at a higher technical and scientific level, applying some solutions for the use of alternative energy sources in the conditions of Uzbekistan, taking into account the world experience, as well as the production of modern equipment and technologies for this field in our country. in order to organize, a scientific-experimental and material-technical base was created for further development and practical application of the use of solar and biogas energy in Uzbekistan[30].

Wind energy. One of the types of renewable energy used in the world is wind energy. The gross potential of wind energy in Uzbekistan is 2.2 million t.n.e. rated as When assessing the potential of wind energy, its instability and low speed are taken into account. It should be noted that the wind speed was determined at heights of up to 10 meters at the

hydrometeorological stations of Uzbekistan, which are far from each other. The location of these stations is determined by the performance of many functions of meteorological issues, and wind is one of these issues. It is practically impossible to use Uzgidromet data to determine the wind speed at a height of 80-100 meters, which is necessary for the operation of modern wind generators. According to the geographical position of the territory of Uzbekistan, wind currents have a seasonal character. The average annual wind speed in the plains is 2.0-5.0 m/sec. According to some data, the gross potential of wind energy is 3179.2 thousand tons. (tons of conventional fuel), and its technical potential is equal to 610.5 thousand t.sh.yo[31].

The average wind speed in Uzbekistan allows wind generators to be installed in high mountain areas and near the Aral Sea. When determining the potential of wind energy, it is necessary to collect data about the dynamics of the change of wind speed in each month and its stability during the month, not the average daily value of wind speed, especially not the average value of ten-day or monthly average speed, but the exact place where wind generators are installed.

Development and implementation of a set of measures aimed at the rapid introduction of new energy and resource-saving technologies in the newly adopted normative legal documents and programs, increasing the awareness of the population about renewable energy sources, the use of renewable energy sources, the disposal of animal husbandry and poultry waste in farms installation of alternative energy source devices for processing, introduction of renewable energy sources according to modern technologies in farms, obtaining alternative energy sources for the needs of farms, including for heating hot rooms, developing solar and biogas energy, taking into account the experience of foreign countries Issues related to

incentives for producers and users, giving them tax and customs benefits and advantages are reflected.

It is important to use biogas in agriculture, to introduce energy-saving technologies and alternative energy sources, to further improve the opportunities of farms, small and medium-sized agricultural enterprises, and to promote modern methods of irrigation.

About biogas, biogas is considered an almost inexpensive environmental fuel and is obtained from solid and liquid wastes of livestock and poultry farming, as well as residues produced in plants and running water. In terms of its properties, biogas is close to natural gas. Biogas can be burned like natural gas in the following processes:

- food preparation;
- electric and thermal energy (hot water and heating of houses);
- as motor fuel.

The biogas production process produces high-quality manure from the residues. Biogas can be obtained not only in farms with a lot of cattle and poultry, but also in private farms.

If several farms and private farms are located close to each other, it will be more economical to organize waste recycling and transfer the obtained biogas to farms and farms through pipelines. For stable, continuous and reliable operation of the biogas plant, the user must know every detail of its operation. Only when these conditions are met, the guarantees given below can be achieved.

CONCLUSION

In conclusion, the stable development of our republic has raised the development and research of new energy technologies and energy law, innovative

technologies, development and implementation of its legal framework to a high level. Sustainable supply of energy, its use and the introduction of advanced innovative technologies in these directions remain one of the most important tasks.

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