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## INTERNATIONAL EXPERIENCE IN THE SPHERE OF LEGAL SUPPORT OF ACTIVITIES FOR USE OF RENEWABLE AND ALTERNATIVE TYPES OF POWER

**Abstract.** This article analyzes the existing international experience in the use of renewable and alternative energy.

The article substantiates the conclusion that the international community understood and accepted as a guide to action principle of the conservation of natural resources. The analysis of the stages of development of international law in this area was made.

The authors carried out a detailed analysis of the experience of the European Union (EU), which has found its expression in a number of directives and regulations. It is noted that the EU has the most effective in the world of the legal framework for renewable energy sources.

Research of the United States experience (USA) has allowed the authors to conclude that the basis for the energy policy of the country has laid down the principle of providing comprehensive assistance to the development and use of renewable energy sources. Detail analysis of the legal system actually implements the principle of the use of renewable and alternative energy in the United States was carried out. Such a comparative analysis allowed making the conclusion that the example of the two continents of the world has accumulated significant experience in support of the energy complex. This experience can be used in solving of national problems.

**Key words:** renewable energy, alternative energy, "green" power, energy resources.

In recent years steady development of alternative power engineering in the world have been continued. The increasing number of the countries understand and begin to perform specific actions on implementation of the technologies using alternative energy sources for production of electricity and heat. Though today alternative energy sources occupy about 3% in world energy balance, the steady tendency to increase in this share is annually observed. According to the International Energy Agency (IEA), the electricity generation share with use of renewable energy resources (except energy of water) in the countries entering into Organization for Economic Cooperation and Development (OECD) shows that in 2016 in electricity generation of the countries of OECD renewable sources (a specific share of 23,0%) took the third place after coal (29,7%) and natural gas (26,0%) [1]. According to forecasts of the agency, by 2021 the share of renewable sources (including hydroelectric power station) will grow to 28%.

The countries which aren't members of OECD consume near  $\frac{3}{4}$  of all alternative energy sources that are provided with use of solid biomass (for example, wood) by households. Thus, if to give an example of Africa, then there nearly a half of all energy is renewable.

During the period from 1990 to 2015 in the countries of OECD, the total amount of energy supply from RES increased from 271 to 510 million t.o.e. (tons of oil equivalent - an oil equivalent of energy), and annual average growth rate made 2,6%. For comparison, growth of use of unrenewable energy resources (including coal, oil, gas and nuclear fuel) constituted 0,4%.

The most impressive figures of growth are shown by the solar power and wind power (44,1% and 22,1% respectively) provided generally at the expense of the countries of OECD and China.

According to the International Power Agency (IPA), in 2015 in the world about 500 000 solar panels daily were installed, and in such countries as China, each hour two wind turbines had been started. The advancing development of "green" power has led to the fact that renewable energy sources for the first time have surpassed coal in

cumulative rated capacity. According to the estimates of MEA, total rated capacities of "green" power have grown in 2015 by record 153 GW – generally at the expense of wind and solar stations. The gain has surpassed cumulative power capacities of Canada, and also gain of capacities for obtaining energy from fossil sources and nuclear power plants.

As a result the share of renewable energy resources in cumulative installed capacities exceeded a world share of coal. However, on the actual generation of the electric power "green" producers lag behind so far. The installed capacity of the station is a maximum quantity of an electrical energy, which it can generate, but the amount of generation changes depending on how long plant works during the certain period of time. Unlike coal power plants, solar or wind ones can't continuously work, therefore in a year they will make less electric power even if their capacity is equal to capacity of a coal station or exceeds it.

During the period from 2010 to 2015 the average world cost of development of energy at the wind stations, established on the land, decreased approximately by 30%, at large solar stations - almost on two thirds, as specified in the report of MEA. According to forecasts of the agency, this tendency will remain also in the next five years, wind energy will become cheaper on average for 15%, solar - for 25%.

Therefore MEA reviewed the forecast of growth of "green" power capacities, having specified that they will grow for 13% quicker during the period from 2015 to 2021, than the agency expected a year ago. Generally it is connected with support, which to this sector is given by the authorities of such countries as the USA, China, India and Mexico.

Studying of experience of use of alternative energy sources by the European states showed that the cumulative share of alternative power engineering in the total amount of energy consumption in the countries of the European Union (EU) constituted 24%. The absolute leader is Sweden, which satisfies nearly a half of the energy demands (52,6%) by means of renewable energy resources in gross final consumption. It is followed by Latvia and Finland (on 38,7%), Austria (33,1%) and Denmark (29,2%). Luxembourg (4,5%), Malta (4,7%), the Netherlands (5,5%) and Great Britain (7,0%) became the most not "green" Europeans in 2015 [2].

It refers electricity generation to this sector and energy carriers on renewable sources, which unites capacities solar, wind and hydropower, and also a geothermal power and use of biomass including biowaste and biofuel. According to plans, by 2020 their general share shall constitute already 20% of cumulative energy consumption in EU countries.

Norway, which isn't entering the EU, remains the absolute European leader of alternative power engineering. In 2004 the share of energy of renewable sources in final energy consumption constituted 58,1% here. By 2015 it increased up to 64,5% [2].

For the last decade fast development of renewable energy resources in the EU is connected with a number of aspects, among which: development of the RES new technologies and, respectively, reduction of dependence on import of energy resources; positive economic effect of use of RES in connection with improvement of the ecological environment.

In the European Union regulation of RES has complex character and is implemented by means of the following documents:

- regulations (are completely obligatory and are applied in all state members);
- directives (are obligatory for state members regarding results which shall be reached, and are subject to reflection in the national legal base);
- decisions (are obligatory only for those subjects to which they are addressed);
- recommendations and the conclusions (aren't obligatory and have declarative character);
- standards (are applied on a voluntary basis, but the EU stimulates their application) [3].

It should be noted that the EU has the most developed regulatory framework in the field of RES, that the queue and promotes development of renewable energy resources.

In 1996 the Green book of the EU in the field of renewable energy resources has been accepted. This work had no legal force, nevertheless, induced the European countries by the beginning of process of dialogue about opportunities of alternative energy sources.

The current situation at the time of adoption of the Green book has been following: The EU had the considerable potential of alternative energy sources, which wasn't used properly. The share of use of renewable energy resources constituted 6% of a gross internal energy consumption.

The priorities of use of alternative energy sources are:

- use of alternative energy sources answers general strategy of sustainable development;
- helps to reduce dependence of the EU on import of energy carriers and thus ensures safety of deliveries;
- helps to increase competitiveness of the European industry in general;
- has a positive impact on regional development and employment;
- enjoys support of the public.

By results of discussions, which took place after adoption of the Green book, in 1997 the White book had been accepted, in which the strategy of the EU in this sphere and the plan of further actions were determined.

In the White book the main task determined in the Green book, namely, achievement till 2010 of 12% of energy use of renewable sources of general electricity consumption was confirmed.

For achievement of this purpose each EU member state owed direct the efforts on:

- increase in use of potentially available renewable energy resources;
- contribution to further decrease in the CO<sub>2</sub> level;
- volatility reduction;
- development of national economy;
- creation of new workplaces [4].

Main goal of the action plan was - to provide equal market opportunities for energy from renewable energy resources without excessive financial expenses. For this purpose the list of priority actions was created, it consists of:

- not discrimination access to the market of the electric power;
- tax and financial actions;
- new initiatives concerning use of a bioenergy for needs of transport, production of heat and the electric power, and, in particular, the special events directed to increase in a market part of biofuel, expansion of use of biogas and market development of solid biomass;

- support of use of renewable energy resources (such as solar energy) in case of reconstruction old and a construction of new buildings.

Attraction of bigger attention to alternative energy sources in case of decision making in such industries as was the purpose of the action plan:

- environment;
- employment;
- competition and government assistance;
- technological developments and development;
- regional policy;
- general agrarian policy and development of the rural zone.

Further in Euro Union had been accepted directives - basic documents for use and development of alternative energy sources.

1) The directive 2001/77/EU of the European parliament and EU Council dated September 27, 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market. The directive 2001/77/EU relied on the White book, confirming the purpose to reach 12% of gross internal energy consumption from renewable energy resources till 2010. At the same time it was determined that the electric power from them shall constitute 22%. The directive 2001/77/EU also provided a number of actions which needed to be realized for obligation fulfillment, accepted by the EU according to the Kyoto protocol of 1997.

In the Directive 2001/77/EU it was stated that at the time of its acceptance the EU took a leading place among the countries of the world on development of the new technologies connected with renewable energy resources. Thus, the Directive was directed to increases in value of this type of energy, at the same time respecting the general principles of the domestic market.

This Directive provided the system guaranteeing originality of the made energy of their renewable energy resources for the purpose of simplification of its exchange and increase in transparency when consumers perform the choice. The guarantee of originality of the energy made from renewable energy resources shall determine from what power source it is made, date and the place of its production, and concerning hydraulic power level in addition shall be determined. The directive became invalid for 01.01.2012 in connection with adoption of the new Directive.

2) The directive 2003/30/EU of the European parliament and EU Council of May 8, 2003 on the promotion of the use of biofuels or other renewable fuels for transport (was valid till 01.01.2012) [4].

This Directive was directed to support of use of biofuel or other renewable fuel for the purpose of replacement of the gasoline or diesel fuel applied in servicing of transport in the EU member state. Also the Directive assumed to promote the solution of such tasks as creation of ecologically favorable safety of supply, development of alternative energy sources and accomplishment of the liabilities concerning climate change.

In the Directive 2003/30/EU the following measures were determined:

- state members shall provide installation of the minimum proportion of biofuel and/or other renewable fuel for their markets and determine in this regard the national indicative purposes;

- biofuel could be made available in any of the following forms: in the form of net biofuel or in high concentration in mineral oil mixes according to the special quality standards for application for needs of transport; in the form of the biofuel mixed with mineral oil derivatives according to the meeting European standards determining the technical specification for transport fuel (EN 228 and EN 590); in the form of the liquid derivative of biofuel, as, for example, ETBE (threefold ethyl butyl air) where there is a biofuel percent;

- EU member states shall check results of use of biofuel in diesel mixes with concentration more than 5% in unadapted vehicles;

- EU member states shall provide general climate and ecological balance of various types of biofuel and/or other renewable fuel and determine priorities in development of that type of fuel which shows the same good economic ecological balance, at the same time in view of competitiveness and safety of deliveries;

- the states - the members of the EU had to provide the public with information on availability of biofuel and other renewable fuel. Concerning a percentage ratio of the biofuel mixed with mineral oil derivatives at excess of 5% fat acid methyl air (FAME) or 5% of bioethanol specific marking about it has to be provided in fuel realization points to consumers [5]. This Directive has become invalid in January 1, 2012.

3) The directive 2009/28/EU of the European parliament and EU Council of April 23, 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. This directive is directed to assistance to use of renewable energy resources and provides increase in energy efficiency in the context of compulsory target use about 20% of energy of renewable sources of the total amount of an energy consumption in the European Union by 2020 [6]. As it is also told in the name of the Directive, it also cancels action of the previous directives: 2001/77/EC and 2003/30/EC [7].

It is possible to allocate the next highlights of the above-stated Directive:

- each state member establishes the indicator calculated according to a share of energy of renewable sources in final consumption for 2020. This indicator shall answer the purpose of the EU – "20-20-20". Moreover, the share of energy of renewable sources in a transport industry shall be at least 10% of general energy consumption in this industry by 2020;

- state members develop national plans of action which establish a share of energy of renewable sources in transport, and also in production of electricity and heating in 2020. Such plans shall consider also influence of other measures for an energy efficiency of a final energy consumption (reducing an energy consumption), to establish procedures of planning and the settlement scheme and access to networks of electricity, maintaining energy of renewable sources;

- EU member states can exchange amount of energy of renewable sources, initiate joint projects on production of electricity and heating by renewable energy resources. Perhaps also cooperation with the third countries in case of observance of the following conditions: electricity shall be consumed by Community, electricity shall be produced by new installations (after June, 2009) or export of the produced electricity shan't use privileges with assistance of production of another;

- each state member shall provide guarantees of an origin of electricity, energy for heating and chilling from renewable sources. Information containing in such certificates of guarantees shall have a single format and be recognized all state members. Such information can also be used for informing consumers on various power sources [8].

It should be noted that according to the Directive 2009/28/EU in EU countries similar National Plans for Development of renewable energy resources were accepted.

Thus, it should be noted that the EU has the most effective regulatory framework in the world on renewable energy resources, thanks to accurate differentiation of functions and tasks between structures of the Union and member countries, accurate information of tasks for development of renewable energy resources in documents and continuous work on enhancement of the legislation in this sphere.

Therefore, availability of such base also is one of the main conditions of development of renewable energy resources in the countries of Euro the Union such in high gear which are observed, and this growth can be connected with adoption in 2001 of the first directive in this area – Directives 2001/77/EU.

In the USA regulation of development of RES is performed both at the federal level, and at the level of separate states. So, in some states a number of the regulating documents for the purpose of support of a growth in volumes of investments into technologies of renewable energy have been accepted:

- Standards of a renewable portfolio (Renewable Portfolio Standards) according to which retail suppliers of an electrical energy shall deliver a certain amount of the electric power, made with use of renewable sources;

- The public funds of development of renewable energy (Public Benefits Funds for Clean Energy) uniting the resources used by states for investments into projects of production and delivery of the net electric power. Such funds are usually created by redistribution of the small amounts on consumer electricity tariffs (i.e. preferential tariffing);

- The standard provisions in the field of environmental protection based on a resulting effect of production (Output-based Environmental Regulations) which establish the extreme size of emissions in the atmosphere on each unit of the made productive energy (i.e. an electrical energy, thermal energy or useful power);

- Standards (conditions) of interconnection (Interconnection Standards) representing an order, procedures and technical requirements in case of connection of the electro generating entities of renewable energy of the specific state to the operating power supply networks [9].

In the field of use and development of renewable energy resources there is a number of the existing regulations of the USA:

1) The final rule about use of renewable energy and alternative use of the existing capacities on an external part of the continental shelf (The Final Rule on Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf). This Rule establishes the framework conditions for production of renewable energy on ECS. The rule also installs the program of allocation of sites and servitudes for the persons which are engaged in competent, safe and eco-friendly types of activity in the sphere of use of technologies of renewable energy as, for example, a construction of sea wind farms, in the territory of the midland shelf. By this Rule methods of the income distribution received from the projects of renewable energy realized on the midland shelf with adjacent coastal states are also established [10].

2) The decree of the U.S. President No. 13514 (Executive Order 13514) on Federal Leadership in Environmental, Energy, and Economic Performance [11]. In connection therewith the Decree all federal agencies are offered to record, provide reports and to reduce emissions of greenhouse gases in the sphere of the jurisdiction.

3) The Duncan Hunter National Defense Authorization Act for Fiscal Year 2009 in which contains several provisions directed to increase in an energy efficiency, use of RES technologies, and also use of alternative energy sources in air forces of the USA. The instruction of this law demands from the Ministry of Defence to consider the possibility of use of a wind and solar energy for supply of expeditionary forces for the purpose of reducing need of gasoline supplies to places of battles where electricity is traditionally produced on generators with the autonomous drive from the engine [12].

4) The law of 2007 on energetic independence and safety. Treat basic provisions of this law:

- increase in sources of alternative fuel due to adoption of the mandatory standard for the renewable types of fuel (Renewable Fuel Standard);

- reducing needs of the USA for oil for the account reducing needs of the USA for oil, and also due to adoption of the national fuel-efficient standard establishing a regulation in 35 miles per gallon by 2020. The law also grants the right to the Ministry of Transport to enter "high-quality standards" ("attribute-based standards");

- Regulations on increase in an energy efficiency of an electric lighting;

- Regulations on increase in an energy efficiency of electric devices;

- Regulations on increase in an energy efficiency of buildings;

- Regulations on increase in an energy efficiency on transport;

- Regulations on financing of the research work (RW) in the field of catching and storage of carbon;

- Regulations on financing of RW in the field of hydrogen technologies [12].

5) The law on Energy Policy" of 1992 (EPAAct 1992) provided 3 types of stimulation of development of renewable energy resources:

- Fixed expansion of the sphere of investment crediting (Section 1916), provision of a 10% investment loan for the majority of the technologies based on use solar and a geothermal power;

- The preferential taxation for producers (tax offsettings) in the amount of 0,015 dollars/kW (with the subsequent adjustment on inflation) for the producers using wind energy and energy of biomass of the closed cycle provided to investors owners of the municipal and private power plants put into operation till July 1, 1999 for a period of up to 10 years. Subsequently the validity of the program was extended 3 times till 2008;

- Use of system of the stimulating payments in the amount of 0,015/kW (Section 1212 of the program of production incentive of renewable energy) for the federal or municipal entities which can't receive tax benefits (offsetting) so aren't payers of the federal income taxes [13]. Such stimulating payments are applied on solar and wind energy, energy of biomass (except municipal solid waste) and a geothermal power (except superheated steam). Action of the program was expanded at the expense of Section 202 of the Energy Policy Act of 2005 which redistributed assignments for the period from 2006 financial to 2026 financial year, having in parallel expanded the list of technologies and owners of the generating objects.

6) The law on Energy Policy dated 2005 (The public law 109-58) is the legislative legal act, approved by the United States Congress of July 29, 2005 and came into force on August 8, 2005. The law provides tax benefits and loans in the field of production of different types of energy, establishes a priority to renewable energy resources and questions of energy efficiency.

In "The strategy of steady power industry of the USA" it is noted that one of strategic directions of federal energy policy provides rendering assistance to development and development of renewable energy resources, to creation and distribution to the USA and beyond their limits of the technologies which are based on these power sources. The solution of this task within the state energy policy will expand the market for the American technologies and will promote expansion of scales of use of RES both within the country, and around the world. It, in turn, will provide an economic benefit (that is important) and, will promote eventually increase in level of global energy security.

Authors of Strategy note that thanks to active actions of national research laboratories of the U.S. Department of Energy in the last 15 years it was succeeded to achieve essential increase in reliability and efficiency of the installations working at RES and also to considerably lower costs for their creation. Now, according to authors of Strategy, the electric power developed in a number of regions of the USA on wind power installations is close to achievement of economic competitiveness in comparison with the electric power made on traditional types of fuel. Allocation of considerable state budgetary appropriations allowed the USA to gain world leaders in the field of photo-electric installations. Also, efforts on transformation of biomass into a new source for electricity generation and motor fuels are made. In the long term efforts go for creation of the technologies and technical means capable to turn hydrogen into one of the main energy carriers.

Also, allowed to determine studying of experience of the states strenuously implementing alternative power engineering that development of renewable power allows solving the major at the moment for the country problems:

- increase in reliability of power supply and economy of organic fuel;
- problem resolution of local power supply;
- increase in level of living and employment of local population;
- ensuring sustainable development of outlying areas;
- implementation of liabilities of the countries on accomplishment of international agreements on environmental protection.

Experts consider that four main conditions are necessary for increase in scales of RES:

- problem definition (development of the state strategy in RES);
- establishment of structure and rules of work in the market (creation of a regulatory framework);
- ensuring a transparent and fair competition from traditional power;
- stimulation of investments.

One of the main conditions of a successful cooperation in the field of RES and their development is availability of a regulatory framework. However, for stimulation and development of renewable energy resources the regulatory framework shall be effective and clear for participants of the market of renewable energy resources. So, the most effective regulatory base in this area the USA and the EU possess that promotes increase in a share of renewable energy resources in their energy consumption and development of the low-researched and widely applied types of renewable energy resources (for example, wind power and energy of the sun). In the EEU countries there is also a huge number of the documents aimed at the development of alternative energy sources, however upon they have declarative character and don't lead to wide use and development of renewable sources though these countries have the considerable potential of these resources. However, they pay poor attention to development in the field of processes of standardization of renewable energy resources at the national and international levels, missing chance to progress stimulation.

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**Аннотация.** Бұл мақалада, қайта жаңартылған және балама энергия көздерінің қазіргі халықаралық тәжірибесі қарастырылған.

Мақалада, халықаралық қауымдастық нұсқаулық ретінде табиғи ресурстарды сақтаудың әрекет ету қағидасын қабылдайтыны және түсінетіні туралы қорытынды негізделді. Осы салада халықаралық құқықтың даму сатылары бойынша талдау жүргізілген.

Авторлар ережелермен мағлұматтар қатарынан өз көрінісін тапқан Еуропалық Одақтың тәжірибесіне талдау жасады. Ол жерде ЕО-ң қайта жаңартылған энергия көздері үшін заңнамалық мәліметтер әлемінде ең тиімді екені атап өтіледі.

Авторлар АҚШ тәжірибесін зерттеу арқылы мемлекеттің энергетикалық саясат негізінде, қайта жаңартылған энергия көздерін пайдалану және дамуында жан-жақты көмек көрсету қағидасы жатқанын қорытындылады. АҚШ-та қайта жаңартылған және баламалы энергиясын пайдалану қағидасын жүзеге асырушы құқықтық жүйеге толық талдау жасалды. Мұндай салыстырмалы талдау жүргізу, әлемнің екі континентінің мысалы, энергетикалық кешенді қолдауда маңызды тәжірибе жинағандығы туралы нәтиже шығарды. Бұл тәжірибе ұлттық мәселелерді шешуде қолданылуы мүмкін.

**Тірек сөздер:** жаңартылған энергия, баламалы энергетика, «жасыл» энергетика, энергетикалық ресурстар.

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**Аннотация.** В этой статье анализируется существующий международный опыт использования возобновляемых и альтернативных источников энергии.

В статье обосновывается вывод о том, что международное сообщество понимает и принимает в качестве руководства принцип действия сохранения природных ресурсов. Проведен анализ этапов развития международного права в этой области.

Авторы провели подробный анализ опыта Европейского Союза (ЕС), который нашел свое выражение в ряде директив и правил. Отмечается, что ЕС наиболее эффективен в мире законодательной базы для возобновляемых источников энергии.

Исследование опыта США позволило авторам сделать вывод о том, что в основе энергетической политики страны лежит принцип оказания всесторонней помощи в развитии и использовании возобновляемых источников энергии. Был проведен подробный анализ правовой системы, фактически реализующий принцип использования возобновляемой и альтернативной энергии в Соединенных Штатах. Такой сравнительный анализ позволил сделать вывод о том, что пример двух континентов мира накопил значительный опыт поддержки энергетического комплекса. Этот опыт может быть использован при решении национальных проблем.

**Ключевые слова:** возобновляемая энергия, альтернативная энергетика, «зеленая» энергетика, энергетические ресурсы