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## **PERSPECTIVE OF DEVELOPMENT OF ALTERNATIVE ENERGY SOURCES IN UKRAINE – ECONOMIC AND LEGAL ASPECT**

Without energy the life of mankind is inconceivable. People have got used to consumption of the organic fuel as power sources (coal, gas, oil). However, their stocks in nature, as we know, are limited. Sooner or later they will run out. However, not everyone thinks about it. The answer on the question «what should we do in terms of energy crisis?» was found a long time ago: it is necessary to look for other power sources – alternative, non-traditional, renewable [1].

What are «alternative energy sources»? It is necessary to appeal to the national legal system in order to answer this question.

The law of Ukraine «About Alternative Energy Sources» defines legal, economic, ecological and organizational bases of alternative energy sources usage and assistance to the expansion of their use in fuel and energy complex [2].

Direct definition of alternative energy sources is fixed in the following way. According to the Article 1, they are renewable sources of energy, including solar, wind, geothermal, hydrothermal and aerothermal energy, waves and inflows of energy, hydraulic power, energy of biomass, energy from organic waste gas, sewage treatment plants gas, biogas and secondary energy resources which include blast furnace and coke oven gases, methane from coal deposits degassing, waste power potential transformation of technological processes [2, Art. 1].

In terms of the EU legislation, «Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC» was accepted.

According to the Directive 2003/54/EC, ‘renewable energy sources’ are renewable inexhaustible sources of energy, namely, wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogas [3].

Directive 2009/28/EC establishes the general legal framework for stimulation of deriving energy from renewable sources; obligatory national tasks for all shares of renewable energy sources in the general final energy consumption and an energetic share of renewable sources for transport. The Directive establishes the rules concerning statistical data exchange between state members; joint projects between state members and the countries which act as the third party; guarantees in the relations; ministerial procedures; information, training and access to the energetic power grid of renewable sources [4].

Thus, Ukrainian and European concept about alternative energy sources is very similar. This is not surprising as the policy of the state is aimed at EU Directives implementation in the national legal system.

The mankind began a search for alternative energy sources for ensuring the activity quite recently after it became clear that natural reserves of hydrocarbons are not infinite. However, it is worth mentioning that already in the middle of the 18th century the first enthusiasts stated the assumptions of possible renewable energy usage instead of fossil resources.

In 1774 an engineer from France Bernard de Forest Belidor published the scientific work «Hydraulic Architecture», where he described the basic principles of hydrotechnical construction. Although it was never about the legislation, this event can be rightly considered as a starting point at the industry development [5].

Undoubtedly, the issues of alternative energy sources use began to be risen relatively recently in Ukraine. It should be noted that with the adoption of the relevant legislation the legal framework of this industry continues the formation and development.

Article 9 of the Law of Ukraine «About Alternative Types of Fuel» points that organizational and economic measures for production stimulation (output) and alternative types of fuel consumption include: providing legal entities and individuals with subsidies and grants as well as tax, credit and other benefits established by the relevant laws of Ukraine for stimulation of new technological developments and implementation of the equipment, materials in the production process (output) of alternative types of fuel. To sum up, the state gave «green light» for alternative energy sources development in the form of financial support [6].

However, stimulation policy of the growth of a share of alternative energy sources has to consist not only of domestic market development, but also of an attraction of investments. In this issue, the world practice developed a reliable solution which became the spur for many countries at the first stages of their greening. It is about a green tariff which has already helped Ukraine to move in this direction. This tool implies that the state buys back all the energy produced by alternative energy sources. Annually the tariff decreases for the new companies (in Germany, for example, by 9%). However, in general, it remains at the level sufficient for fast business development. In Ukraine, it is still an only effective tool for

attracting investors. More than 50 companies, which have already got this tariff, affirm transparency and simplicity of the procedure.

The co-author of the law about «green tariffs» N. Martynenko said: «While the development of the document the European experience was studied, similar coefficients and similar type classification of «pure» energy were used. The primary purpose was a creation of capacities which would seriously affect the energy balance» [7].

Comparing realization conditions of a green tariff in Ukraine and Germany, the main difference should be noted. It is based on various crediting and investment approaches. As a rule, ordinary Germans earn money from a green tariff investing their personal funds. A situation in Ukraine is different. There is a trend of tariff use to a much greater extent by the companies and corporations rather than by ordinary citizens. The thing is that German banks provide citizens with the loans of 2% per annum for 10 years. So, in 15 years of the wind farm work the investment will be paid off completely. For 5 years more the owners will get profit as the green tariff works during 20 years and then subsidies stop. In 2030 Ukraine, by the way, it is planned to cancel a green tariff for objects of the generation of alternative energy sources, which are put into operation till 2020 [8].

In Ukraine, the credits for individuals can be up to 30% per annum. Such rates for Germans are pretty pricey. However, Ukrainian citizens do not invest in alternative energy sources not only because of high rates on the credits. Because of low credibility level to the government and features of mentality, the average Ukrainian is not ready to trust the state in issues for a long-term. Ukrainians are more interested in short-term investments with a faster possibility of receiving profit.

Returning to Germany, it should be noted that there are two impressive figures in its energy sector. The first is a share of generation of renewable energy sources, which makes a third of the general production. The second is that more than 70% of investments into alternative energy sources were carried out by ordinary citizens due to the existing monetary policy.

In comparison, in Ukraine, the power production share by alternative sources makes 1,5% of the general generation. Mostly, the large companies, such as DTEK, «Vitroparki Ukraini» or «Akvanova» invest in them.

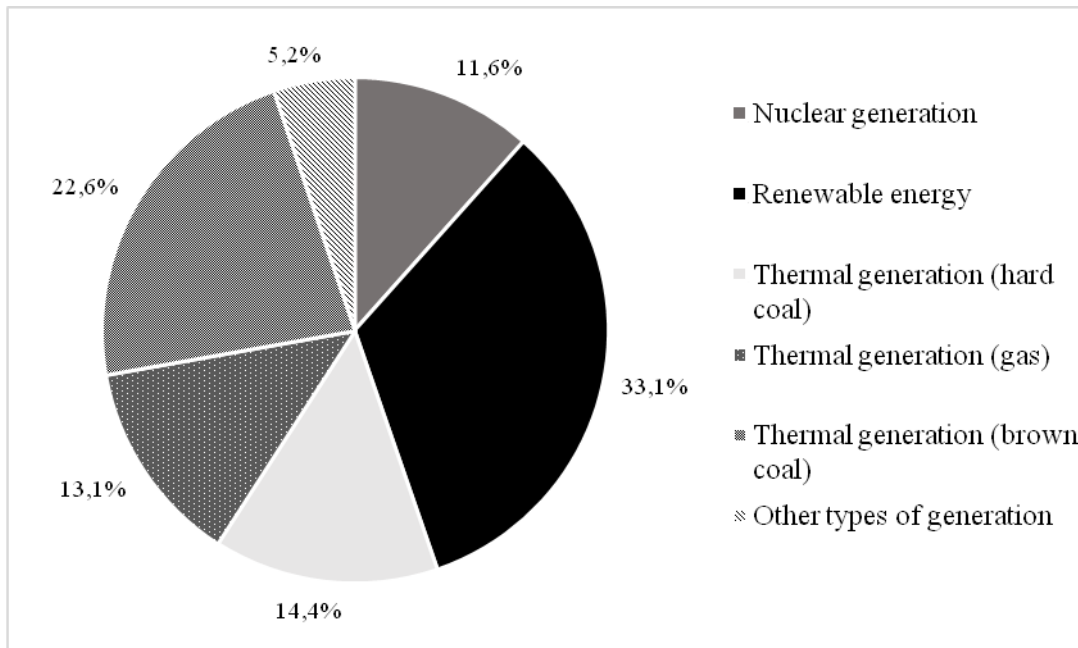


Figure 1 – Structure of the electric power generation in Germany (2017)

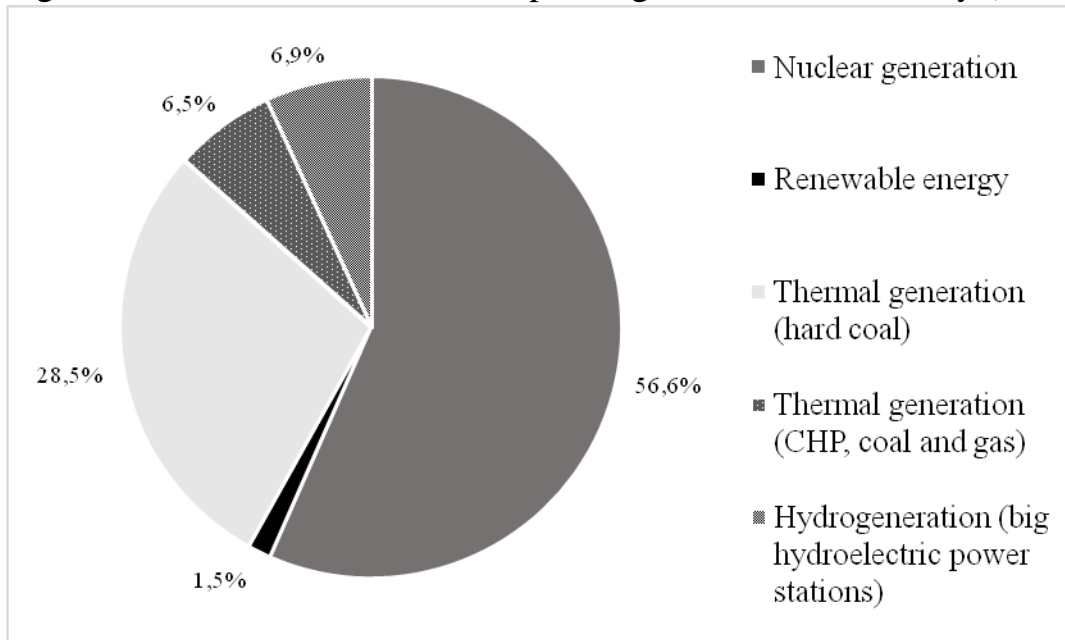


Figure 2 – Structure of the electric power generation in Ukraine (2017)

In Germany transition to alternative energy sources began more than 30 years ago. Nowadays, the idea of economic structural transformation has been created in the national project called «Energetic Turn» – Energiewende [8].

In Ukraine, there is also a similar plan which is reflected in the bill ‘About the Basic Principles (Strategy) of the Ukrainian State Environmental Policy until 2030’. It demands the acceptance by the Verkhovna Rada [9]. This law is based on the Association Agreement between Ukraine and the EU. It is in sustainable development goals which were accepted by the UN. Formerly, the Cabinet of Ministers accepted the low-carbon development Strategy of Ukraine till 2050. This Strategy provides the

emission reduction of greenhouse gases, fossil fuel refusal and the start of an investment in alternative energy sources [10].

It is important to stress that the Ukrainian Institute for the Future made the forecast of power capacities within temporary terms until 2035. It is based on the strategy of the Ukrainian Environmental Policy.

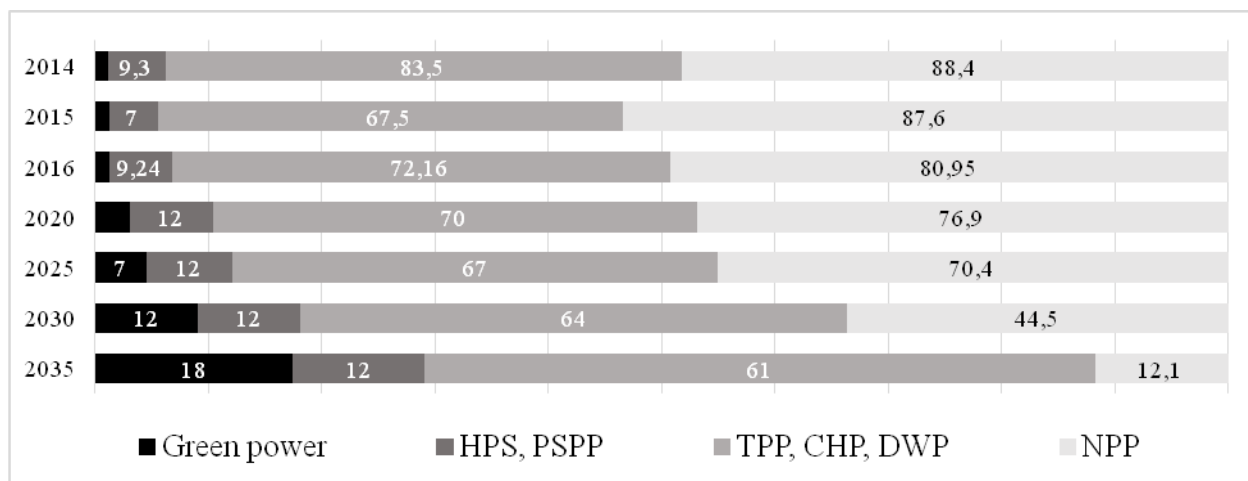


Figure 3 – The forecast of the Ukrainian power capacities until 2035, bln kW h [11].

To sum up, it is possible to highlight the following conclusions. Today it is extremely important to undertake the reform of the Ukrainian electricity market provided by the law. The Ukrainian electricity market demands liberalization and reforms which would allow it to become an organic part of the general European power market architecture. Today's insufficient diversification of risks makes Ukrainian electricity market very sensitive to any force majeure [11].

For Ukraine, the power sources which are obtained from renewable sources could become a crucial point of economic growth and the GDP driver. Firstly, new technologies always give an increased level of added value. Secondly, the green tariff which works till 2030 is an attractive incentive for any investments including foreign. Thirdly, correctly created and politically reasonable idea of power independence from Russia could stimulate the regions to the transition to alternative sources energy. However, it must be said that even Europe, which has been developing the renewable sector for decades, cannot cope without the state subsidizing. So, Ukraine should not think of rapid growth possibility in this sector without effective government investments and reforms, which have to be implemented.

Experience of the European states shows that more than a half of the country can be transferred to renewables. For instance, Sweden transferred 51% of the economy to alternative energy sources despite of the existence of the neighbouring Norway which is rich in gas. In turn, Denmark produces 25% of all current electricity using wind only. Actually, Ukraine can shortly reach an indicator of 5-7% beginning to use alternative sources. It is quite possible to reach a share of renewable sources energy production (including today's large hydroelectric power stations) of 30% in

several decades. It can be expected, if all the necessary recommendations of the European Union with various mechanisms and resources attraction are introduced [7].

It must be pointed out that the future of the world and Ukrainian energy are alternative energy sources.

Undoubtedly, for competent environmental policy implementation in this sphere it is necessary to have strategic literacy in legislating, the transparency of the carried-out activity, a favourable climate for investment and attractive terms for crediting.

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