

**Management mechanisms and  
development strategies of  
economic entities in conditions  
of institutional transformations  
of the global environment**

**Collective monograph edited by  
M. Bezpartochnyi**

---

ISMA University  
Riga (Latvia) 2019

**Kaletnik Grigoriy**

*Doctor of Economics, Professor,  
Chair of Administrative Management  
and Alternative Sources Department*

**Pryshliak Natalia**

*PhD, Senior Lecturer of Administrative  
Management and Alternative Sources  
Department*

*Vinnitsia National Agrarian University  
(Vinnitsia, Ukraine)*

**BIOENERGY  
POTENTIAL  
DEVELOPMENT OF  
THE AGRARIAN  
SECTOR AS A  
COMPONENT OF  
SUSTAINABLE  
DEVELOPMENT OF  
UKRAINE**

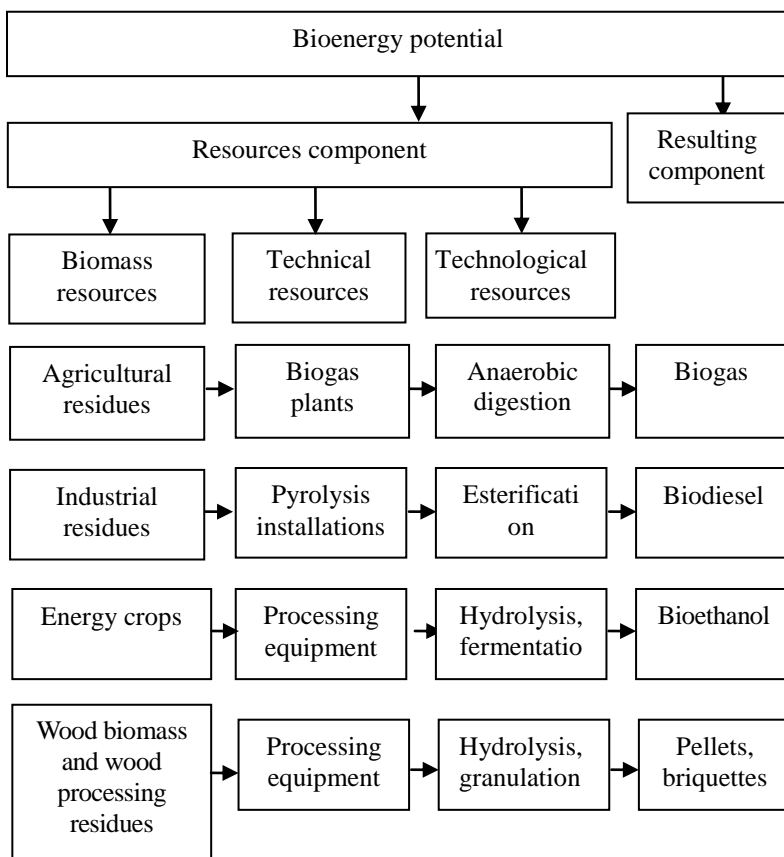
Ukraine has a significant biomass potential, which is economically feasible for energy production. The main components of the potential are primary agricultural wastes (straw, corn for production of corn and sunflower) and energy crops, whose cultivation on an industrial scale is actively developing in the European Union. Depending on the yield of agricultural crops, this potential varies within the range of 27-37 million tons of fuel equivalent per year, which accounts for 13-18% of consumption of primary fuels in Ukraine. According to the State Agency for Energy Efficiency and Energy Conservation of Ukraine (2018), the annual technically achievable bioenergy potential is 31 million tons. etc. (including electric – 10.3 million tons of electricity, heat – 20,7 million tons of oil).

According to the systems approach (Kaletnik, 2018), the “bioenergy potential” of any economic system can be viewed as a cumulative opportunity for the production of material goods using resources that are systemically interconnected. However, this approach does not determine the purpose of the use of capacity, therefore, it is somewhat limited.

Effective approach to the interpretation of the category “bioenergy potential” is the most objective. According to this approach, not only available and potential resources are taken into account, but also the possibility of using them for relevant tasks. Thus, the concept of “bioenergy potential” is directly related to production, with the result that biomass resources are transformed into a new quality.

Bioenergy potential is a reflection of possible achievements of effective end-points in the most expedient way to use existing resources. Also this term can signify the use of available and strategically possible biomass, expressed in the potential ability to produce energy sources of a certain composition, technical conformity and quality in the right

amount. Taking into account the above, the structure of the bioenergy potential can be represented as a link between its two components: resource and efficient (Figure 2.6).



**Figure 2.6 Components of bioenergy potential**

*Source: formed by the authors*

Ukraine, as well as a number of other countries, views the achievement of such strategic goals as food security, energy security and defense capabilities of the country as priorities at the current development stage, which justifies the need for the development of the energy sector. As indicated in the Outputs of the Energy Industry of Ukraine for 2016, “Recent years have proved difficult for the Ukrainian energy sector”. Its condition is most affected by the destruction of oil,

gas, and coal industry infrastructure; the shortage of certain types of energy resources; lack of commitment to supply diversification of certain types of energy under conditions of high volatility in prices on world markets; high monopolization of certain segments of the energy market of Ukraine as well as reluctance of the industry and the consumer market to increase energy prices. In addition, in 2016 the decrease in oil production resulted in dependence on imports of petroleum products (the share of imports reached 80%). Thus, according to the State Statistics Committee of Ukraine (2018) energy dependence of Ukraine on energy imports is 60-70%.

The monopolization of the structure of production and sale of petroleum products has caused negative consequences for both consumers and producers, since this is primarily due to the formation of monopolistically high prices for these products. In addition, environmental harm from emissions of cars running on gasoline and diesel fuel, is becoming more tangible. Therefore, the use of alternative fuels every day is of particular relevance. In particular, we are talking about the production of energy carriers of biological origin, or biofuels: biodiesel, bioethanol, biogas. In Ukraine, the biofuels market is just beginning to form. The main reasons for its slow development are the low level of environmental awareness of consumers and the lack of state support, because the production of biofuels all over the world is subsidized. A huge problem is that most of feedstock from which biofuel could be delivered is currently exported to European countries and not used in Ukraine, although for this purpose Ukraine has the appropriate legislative, scientific and technical potential.

Currently agriculture is considered one of the potential industries, it can produce feedstock that is needed for the production of biofuels. The use of a certain part of agricultural products for the production of biofuels is considered as an alternative to traditional agricultural practices. Taking into account the , current trends in the development of market relations, a system of management decisions and actions aimed not only at achieving maximum production and profits, but also at balancing the economic, environmental and social interests of the enterprise plays a significant role for efficient production in agricultural enterprises combined with the conversion of bioenergy crops.

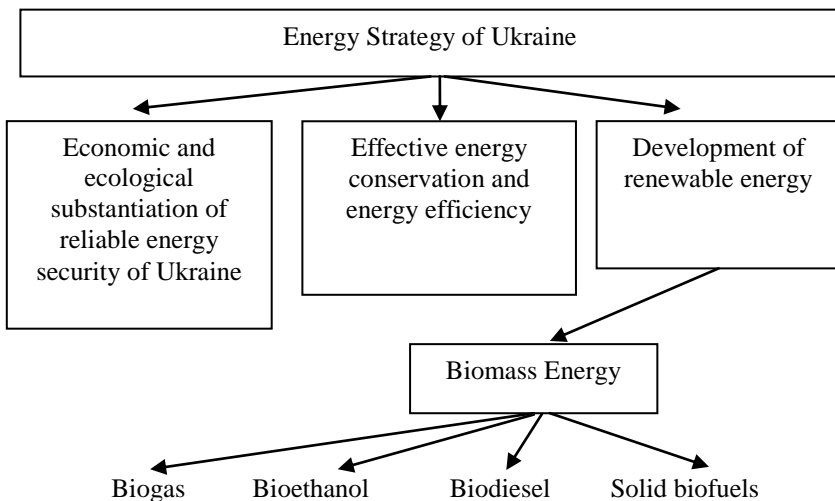
Biomaterials need not only be grown as the primary source of energy, but also to be converted into fuel with subsequent conversion into useful energy. However, from an economic point of view, conversion is not only the transfer of certain resources from one sector

to another with obtaining future benefits, but also the process of economic restructuring, and it is quite complex and dynamic. We believe that ensuring efficient production in agriculture, combined with the conversion of bio-raw materials, requires the interaction of a set of technological, technical, economic, organizational, managerial, social and other activities, enterprises, diversification of production activities, market entry of a new type of product, improvement of the ecological status of the location area enterprises and should be the goal of management decisions on the conversion of organic raw materials. However, for the formation of a strategy for managing the conversion process of organic raw materials in agricultural enterprises, an analysis of the external and internal environment of the economy in relation to this type of production activity is necessary. The choice of management strategy is determined by the ratio of strengths and weaknesses characterizing the process of conversion of organic raw materials in agricultural production. It is an effective strategy for the development of the bioenergy industry in agriculture that can increase the internal potential of an enterprise and, through the use of external opportunities, strengthen its financial condition.

One of the directions for the development of energy security and the growth of biofuel production is the implementation of measures in accordance with the Energy Strategy of Ukraine until 2035.

The strategy is developed taking into account the trends of geopolitical, macroeconomic, social and scientific and technological development of the country, which have certain risks of determining these factors. Therefore, it is necessary to ensure continuous monitoring of the Energy Strategy and periodic clarification of the volumes and deadlines provided for by the strategy, taking into account price movements for fuel and energy resources in the world and the country, state development programs, achievements of scientific and technical progress, and improvement of environmental legislation. The main directions of energy strategy development are shown in Figure 2.7.

Thus, the implementation of the state energy program will ensure the development of energy-saving technologies and reduce energy dependence. Thus, to reproduce the natural resource potential, the possibility of greener production and the development of bioenergy have an impact. This is explained by the fact that in the agrarian sector the production process is closely related to living organisms: plants and animals, biological processes that take place according to certain laws of nature and objectively require the adaptation of individual technological



**Figure 2.7 The main directions of development of the energy strategy of Ukraine**

*Source: formed in accordance with the Energy Strategy of Ukraine for the period until 2035 "Safety, energy efficiency, competitiveness"*

processes to the rhythm of nature, which characterizes the need to take into account the biological features of certain types of natural resources, including bioenergy. Considering the above, the development of bioenergy is an important direction in enhancing the competitive advantages of the domestic economy and preserving the environment, creating opportunities to ensure a balanced development of the industry. In order to determine the main factors of influence, a SWOT analysis has been proposed. On its basis, external opportunities and threats are established, as well as internal strengths and weaknesses in the implementation of the conversion process of organic raw materials (Table 2.1).

To establish links between the most significant strengths and weaknesses of the internal environment, as well as the capabilities and threats of the external environment, a matrix of interrelationships of the SWOT analysis has been proposed (Table 2.2). When choosing a strategy, the greatest attention is given to the interrelations of the weak sides of the internal environment and the threats of the external environment. The combination of this relationship can lead to a halt in the production process and damage, instead of the expected profit. When carrying out the process of conversion of agricultural feedstock in

agricultural enterprises, an unrealized opportunity may turn into risk factors (threats).

*Table 2.1*

**Evaluation of the external and internal environment of the agricultural enterprise in the conversion of organic feedstock into energy by the method of SWOT-analysis**

<b>Strengths</b>	<b>Weaknesses</b>
1. High potential of available organic feedstock for conversion into energy resources	1. The instability of the supply of feedstock for the conversion of energy
2. Organic feedstock – local fuels are cheaper than traditional fuels.	2. Lack of long-term contracts for the supply of conversion products
3. Production of own energy (strengthening of energy security)	3. Low level of technological conversion line support
4. Reducing the negative impact on the environment	4. Lack of incentives to reduce the negative impact on the environment
<b>Opportunities</b>	<b>Threats</b>
1. The possibility of attracting additional funds	1. Competition with other biofuel producers
2. Creation of new jobs	2. Lack of quality standards for fuels produced from agricultural feedstock
3. Export opportunities for fuels produced from agricultural feedstock	3. Low level of state (financial) support for the energy use of agricultural feedstock

*Source: formed by the authors*

The SWOT analysis identifies the following key biofuel policy needs for Ukraine (Zulauf et al, 2018): investment in breeding programs and science to develop new and high-yield crops; incentives to bring uncultivable land into production, such as tax exemptions and low interest loans; investment in biofuels infrastructure; establishment of a government agency for biofuels.

The development of energy from renewable sources – especially liquid biofuels – should be the main goal of Ukraine’s energy policy. The reasons for this are:

- renewable energy plays an important role in reducing carbon dioxide emissions (CO<sub>2</sub>)
- increasing the share of energy from renewable sources helps to ensure energy security by reducing Ukraine’s dependence on energy sources imported;

Table 2.2

**Matrix of interrelations of internal and external factors of the process of conversion of feedstock in agricultural enterprises**

<b>Factors</b>	<b>Opportunities</b>	<b>Threats</b>
<p><b>Strengths</b></p> <p>1. High potential of available agricultural feedstock for conversion to energy.</p> <p>2. Biofuels produced from local agricultural feedstock are cheaper than traditional fuels.</p> <p>3. Own energy (energy security of the enterprise).</p>	<p>1. Strengthening the energy security of the enterprise due to the direction of attracted additional funds for the production of energy from its own sources.</p> <p>2. Use of available feedstock for conversion into biofuel with attraction of labor resources and the possibility of obtaining additional funds.</p> <p>3. Diversification of production activities, entry into new markets.</p>	<p>1. Competition with other biofuel manufacturers.</p> <p>2. Lack of quality standards for biofuels.</p> <p>3. Low level of state support on biofuels.</p> <p>1. Stimulation of the use of energy produced from agricultural feedstock to reduce the negative impact on the environment to obtain state support.</p> <p>2. Use of own feedstock for biofuel production, which reduces production costs and increases the competitiveness of the goods.</p>
<p><b>Weaknesses</b></p> <p>1. The instability of the supply of feedstock for the conversion energy.</p> <p>2. The absence of long-term contracts for the supply of goods conversion.</p> <p>3. Low level of technological conversion line support.</p>	<p>1. Expanding the export potential of bioenergy resources, which may lead to long-term contracts.</p> <p>2. Establishment of an additional technological line for the conversion of agricultural feedstock at the expense of raised funds.</p>	<p>1. Measures aimed at the stability of the supply of agricultural feedstock and bioenergy resources, taking into account the quality standards of the goods received.</p> <p>2 Concentration on preventing the stop of the line of conversion of agricultural feedstock and obtaining preferential state support.</p>

Source: formed by the authors



- in the future, renewable energy sources will become economically competitive compared to the traditional sources used today;
- the introduction of energy from renewable sources contributes to the development of the agro-industrial sector, helps to create new jobs.

The most attractive are the strategies arising at the intersection of the fields of strength and opportunities:

- strategy of enhancing energy security, the use of its own organic feedstock for conversion into energy resources and the use of energy resources obtained at the enterprise;
- strategy of using the existing potential of agricultural feedstock for the conversion into an energy resource with the subsequent sale of the product obtained and the attraction of additional labor resources;
- strategy of diversification of its own production program and access to new markets.

The formation and rapid development of the biofuel market in Ukraine is a requirement of today. After all, the possibilities of reducing the energy dependence of our state through the production and sale of biofuels exist and have good prospects to become one of the important priorities for the development of the Ukrainian economy.

Thus, the implementation of these strategies for a separately defined agricultural enterprise is very problematic. Therefore, for agricultural enterprises, when making management decisions on the choice of a conversion strategy, it is necessary to take into account the production and financial potential of a particular farm, since the right choice of management actions will ensure the choice of a strategy that is consistent with the company's ability to convert organic raw materials. The result of such actions may be the improvement of production activities, its diversification; the possibility of entering new markets, in particular biofuels; stabilization of the financial condition of agricultural enterprises.

The agricultural sector has significant potential for the supply of feedstock needed for the production of bioenergy. At best, this can lead to a reduction in greenhouse gas emissions and will benefit soil and water quality, and will also contribute to biodiversity. However, in each case, it is necessary to compare market prices or the alternative value of agricultural products and raw materials used to produce renewable energy.

Consequently, the development of the biofuels industry in the conditions of its own energy resources shortage and a significant energy dependence of Ukraine is a decisive necessity of the present, capable of

making a significant positive impact on the development of the economy as a whole, increasing the level of produces commodities with high added value, and stimulating the development of related industries and agricultural production in particular. In addition, as world practice shows, a significant social effect from the development of biofuel production is represented by the creation of additional jobs and the improvement of the living standards of the population.

## References

1. *Energy sector of Ukraine: the results of 2016* Available from: [http://razumkov.org.ua/uploads/article/2017\\_ENERGY-FINAL.pdf](http://razumkov.org.ua/uploads/article/2017_ENERGY-FINAL.pdf)
2. *Energy Strategy of Ukraine for the period up to 2035 “Safety, Energy Efficiency, Competitiveness”*. Order of the Cabinet of Ministers of Ukraine dated August 18, 2017 No. 605-p. Available from: <http://zakon2.rada.gov.ua/laws/show/605-2017-%D1%80>
3. Kalemik G. (2018), *Production and use of biofuels: Second edition, supplemented: textbook*. Vinnytsia: LLC “Nilan-Ltd”, 336 p.
4. *The official website of the State Agency for Energy Efficiency and Energy Conservation of Ukraine (2018)*. Available from: <http://sae.gov.ua/>
5. *The official website of the State Statistics Committee of Ukraine (2018)*. Available from: <http://www.ukrstat.gov.ua/>
6. Zulauf C., Prutska O., Kirieieva E. and Pryshliak. N. (2018), *Assessment of the potential for a biofuels industry in Ukraine. Problems and Perspectives in Management*. Vol. 16(4), pp. 83-90. doi:10.21511/ppm.16(4).2018.08