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MARKETING RESEARCH OF AGRICULTURAL ENTERPRISES: THEORETICAL AND PRACTICAL ASPECTS

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ANNOTATION

In the current conditions of global transformation, the role of managing the marketing activities of agricultural enterprises is growing. An essential element of effective business is the understanding and use of the concept of marketing in the management of agricultural enterprises. The quality of marketing activities in management is decisive, as it determines the highly profitable rhythmic activities of the enterprise.

Studies of agricultural enterprises in Ukraine confirm that the introduction of marketing, although becoming more widespread, but not yet fully used all existing forms of marketing management. That would ensure the competitiveness of agricultural enterprises, adaptation to constant changes in the environment and market conditions, the stability of economic conditions.

The success of any agricultural enterprise depends not only on the financial results of its activities, but also on the proper organization of marketing activities and the flexibility of the management system, because under market conditions the company's management needs market reviews, purchasing power research, sales forecasting calculations of the effectiveness of product advertising.

Management, which does not keep up with the dynamic changes inside the enterprise and in the external environment, leads to the "death of ideas" and makes the agricultural enterprise incapable of adaptation and further development, and marketing is an integral part of the enterprise.

The scientific basis of management of economic development of agribusiness entities is revealed in the works of Ukrainian economists - V. Andriychuk, I. Balanyuk, I. Grishova, M. Malik, P. Sabluk, A. Tretyak, O. Shpykulyak and other scientists. Theoretical issues of strategic management are covered in the scientific works of M. Albert, O. Amosov, I. Ansoff, J. Zavadsky, M. Meskon, G. Minzberg, G. Mostovoy, G. Odintsova, M. Porter, A. Thompson, A. Fayol and other domestic and foreign authors. Theoretical foundations of marketing management became the subject of research by G. Armstrong, L. Balabanova, O. Varchenko, A. Voychak, O. Hudzinsky,

P. Doyle, G. Kaletnik, S. Kamilova, F. Kotler, J.-J. . Lamben, I. Litovchenko, L. Naumova, M. Oklander, O. Osnach, P. Ostrovsky, A. Pavlenko, I. Reshetnikov, M. Sakhatsky, I. Solovyov, O. Chirva, O. Shpychak, many other domestic and foreign scientists.

Theoretical developments and practical recommendations of these scientists have formed a common methodological basis for marketing management of agricultural enterprises. However, research on the management of marketing activities of agribusiness entities is not sufficiently systematic and complete.

In the practice of domestic agricultural enterprises there are a number of shortcomings that reduce the effectiveness of marketing activities. These include: chaotic use of certain elements of marketing, reduction of marketing functions only to stimulate the sale of goods, food, focus on the short term, lack of flexibility and ignorance of consumer demand.

To solve these problems, it is necessary to develop measures to promote the sale of products through the formation of a system of sales support and development of agri-food market infrastructure, which would cover the district and regional levels. In these conditions, the role of marketing activities of agricultural enterprises and the need to develop recommendations for the organization and development of marketing tools in agro-industrial production at the enterprise and regional levels, which determines the relevance of this study.

The results of the presented research in the monograph are made within the initiative of the Department of Agrarian Management and Marketing of Vinnytsia National Agrarian University "Development of the concept of marketing management of agricultural enterprises" state registration number: 0122U002111 for 2022–2024.

TABLE OF CONTENTS

10.46299/979-8-88680-819-3.6

6. Formation of marketing models of agricultural enterprises focused on the production of biofuels

Marketing is one of the most important types of economic and social activities, however, it is often misunderstood. The purpose of marketing is to improve the quality of goods and services, improve the conditions of their purchase, which in turn will lead to an increase in living standards in the country, improving the quality of life. Marketing (from the English market - market) - a comprehensive system of organization of production and marketing, focused on meeting the needs of specific consumers and making a profit based on market research and forecasting, studying the internal and external environment of the exporting company, developing strategies and tactics through marketing programs. These programs include measures to improve the product and its range, study of buyers, competitors and competition, to ensure pricing, demand, sales and advertising, optimize the channels of movement of goods and sales, organization of technical service and expanding the range of services. are presented. Marketing as a product of a market economy is in a sense a philosophy of production, fully (from research and development to sales and service) subject to market conditions and requirements, which are in constant dynamic development under the influence of a wide range of economic, political, scientific technical and social factors. Manufacturers and exporters consider marketing as a means to achieve the goal set for this period for each market and its segments, with the highest economic efficiency. However, this becomes real when the manufacturer has the opportunity to systematically adjust their scientific, technical, production and marketing plans in accordance with changes in market conditions, maneuver their own material and intellectual resources to provide the necessary flexibility in strategic and tactical tasks, based on the results of marketing research. Under these conditions, marketing becomes the foundation for long-term and operational planning of production and commercial activities of the enterprise, drawing up export programs of production, organization of scientific and technical, technological, investment and production and sales work of the enterprise, and marketing management is the most important element.

Marketing is a process in which individuals and groups get what they need and

want by creating and sharing goods and consumer values. Exchange processes do not happen by themselves. Sellers must look for buyers, identify their needs, create quality goods and services, promote, store and deliver them. Product development, market analysis, communications, distribution, pricing and customer service are the main types of marketing activities. It is believed that marketing is mainly engaged in the selling party, but buyers, it turns out, take part in it - when looking for the right products at affordable prices. Purchasing agents are also involved in marketing, looking for sellers with whom you can make profitable deals. The seller's market assumes that the seller has more power and the buyer is a more active participant in the market. In the buyer's market, the buyer has more power, and the seller must be a more active market participant. In a standard situation, marketing should serve the end-user market in conditions of competition.

In the conditions of development of market relations, formation of economy and functioning of the enterprises based on principles of marketing, much attention should be paid to formation of integral, scientifically proved system of the organization, formation and management of the enterprise in modern conditions. Such a system, in our opinion, can be marketing management of the enterprise, ie the creation and operation of such enterprises that would best meet the needs and demands of the market, could flexibly and adequately respond to changes in external and internal market conditions, increase profitability and production enterprises as a whole, etc.

The study of domestic and foreign sources proves that in modern economic theory and practice, the development of marketing - the main condition for the company out of crisis, achieving market goals. The subject of marketing is the relationship of an entity that arises between it and consumers, as well as other entities in a particular market.

In our opinion, it is necessary to clearly articulate the principles, goals and functions of marketing as an enterprise management system. Marketing as a way of working in a market economy, based on principles. First of all, we must name the following principles of marketing:

– free choice of the purpose and strategy of functioning and development,

concentration of all efforts on the crucial directions of activity;

– openness to the consumer, his wishes and needs, active adaptation and at the same time purposeful influence on them;

– focus on the end result of production and marketing activities, as well as on the long-term prospects of the company;

– an integrated approach to problem solving, which involves setting goals in accordance with the resources and capabilities of the firm;

– optimal use of centralized and decentralized principles in management, ie constant search and sale of reserves, increasing the efficiency of production and marketing activities by involving all employees of the company in creative work;

– active policy, which consists in the offensive strategy of the firm's development in terms of innovation, production and market, ahead of competitors;

– scientific approach to solving marketing problems, ie systematic analysis, use of program-target method of marketing research management, as well as feedback;

– flexibility in achieving the goal through rapid adaptation to changing environmental conditions.

– In accordance with these principles, marketing performs a number of strategic, tactical and operational tasks.

To better understand the essence of management based on the principles of marketing, it is also necessary to formulate the basic functions of marketing management. According to the above tasks, the main functions are:

– comprehensive study of the market and problems related to marketing;

– coordination of parameters, characteristics and prices for products with the wishes and tastes of consumers;

– marketing and sales planning;

– physical distribution of products;

– ensuring communication relationships with consumers, implementation of agreements;

– after-sales service, setup, feedback.

To consider the marketing management of the enterprise as a holistic system, we

define the concept of marketing, ie the form of marketing organization that dominates today in market economies. The concept of marketing originally originated in countries with highly developed economies, but involves solving problems that have arisen in today's business environment in our country.

In its purest form, the concept of marketing is a set of activities that facilitate the smooth passage of goods and services from producer to consumer, and it is not a new category. The main task of the concept of marketing in modern business conditions is the process of integrating the efforts of enterprises to achieve the overall goal of its activities, which can not and should not be aimed at solving internal problems of the enterprise, but should focus on production of goods and services. When applying the concept of marketing in each country it is necessary to take into account the specifics of existing and existing socio-economic relations.

The use of the concept of marketing in those forms and types that have proven their effectiveness in countries with rational economies based on the theory of conversion of different socio-economic systems, is wrong for the application of marketing in specific activities. In order for a certain marketing concept to start working as a working philosophy of the company, you need a detailed approach to implementing the marketing concept, studying the organization, the company's activities, analysis of its market position and more. In fact, the concept of marketing is very difficult to implement in the enterprise system, but then very easily take root, if the company has certain conditions for this.

Socio-economic development of the region largely depends on its ability to attract investment. Currently, the investment attractiveness of the region determines the degree of its competitiveness. The influx of investment in the region creates the preconditions for increasing productivity and quality of life of its population. However, the stability of favorable conditions for investment is an important factor in investment attractiveness.

Investment activity in the region is the intensity of investment in fixed assets. The investment attractiveness of the region is an objective prerequisite for investment and is quantified in the amount of capital investments that can be attracted to the region,

based on its inherent investment potential and the level of non-commercial investment risks. The investment attractiveness of a region is based on the investment policy pursued in a particular region.

Currently in Ukraine there is an intensification of competition between regions for investment resources. Mechanisms are constantly being improved, new approaches are being created to intensify investment processes. Each region is trying to develop its own effective investment policy. In this regard, it is reasonable to develop a concept of attracting investment at the territorial level. To do this, you must choose the priorities of the region, taking into account the structure of the economy. The inflow of investments should be aimed primarily at strengthening and diversifying export potential, promoting competitive goods and technologies in foreign markets, the development of import-substituting industries, the introduction of advanced technologies and modernization of industry.

In our opinion, the concept of regional marketing is the most promising and implements marketing management actions that contribute to the inflow of investment in the region. At the same time, this concept forms a new type of thinking of regional leaders and entrepreneurs, helps to meet the needs identified in the course of marketing research needs of residents of the region and participants in the investment process. In the conditions of innovative or information-creative economy the image and brand of the region, as well as marketing strategies of its development are a necessary factor in the realization of regional potential to the greatest extent.

Regional marketing is a system of attracting new economic agents to the region, which contributes to the prosperity of the region as a whole. The investment attractiveness of the region largely determines the level and quality of life of its population. Investment is both a cause and a consequence of economic growth, representing the relationship and interaction of major economic categories.

It should be understood that the marketing of the region is aimed at promoting products, services, goods, enterprises, industries that are specific to the territory and, of course, to attract investment in these areas. And to achieve this goal it is necessary to develop a competitive policy of the regions. And the competitive focus will be

expressed in the creation of better, compared to other regions, the conditions of business, education, tourism, housing and conditions for investment.

In order to make the region more attractive for investors, it is necessary to develop a development strategy, marketing strategy, develop infrastructure, show competitive qualities, develop information materials.

To date, only some marketing tools are used in the management of regional development, there is no systematic approach to the organization of regional marketing. However, only the creation and implementation of a system of marketing activities at the regional level, rather than individual marketing activities will increase its competitiveness and, consequently, investment attractiveness.

The system of marketing activities of the region, aimed at increasing investment attractiveness, should include analysis and forecasting of foreign markets; clear formulation of priority goals and strategies of the region's development; development of a marketing complex.

Analysis and forecasting of external markets, in turn, involves assessing their potential, identifying strengths and weaknesses through SWOT and Clear formulation of strategies and goals is determined based on the overall strategic development goals of the region. In many respects, the strategic goals of the region's development and its investment attractiveness are determined by a set of marketing tools for the distribution of products produced by enterprises in the region, with investments. Therefore, the formation of priority strategies and development goals of the region in terms of a set of marketing activities should be based on:

- positioning of product strategy and segmentation of the regional market, as well as portfolio analysis of products produced in the region;
- experience of successful regions with a more favorable investment climate;
- choice of growth strategy for sustainable regional development;
- creation of an optimal sales network;
- formation of communication policy of the region.

As you know, the main product in regional marketing is the territory of the region, which necessarily has its competitive advantages and disadvantages [119].

The relationship between the marketing system and investment attractiveness of the region is shown in Fig.1.

Thus, it should be understood that the region's marketing is becoming an important tool to increase investment attractiveness, aimed at constantly promoting positive information about the region in order to create a favorable attitude to it, to products and services and local business conditions.

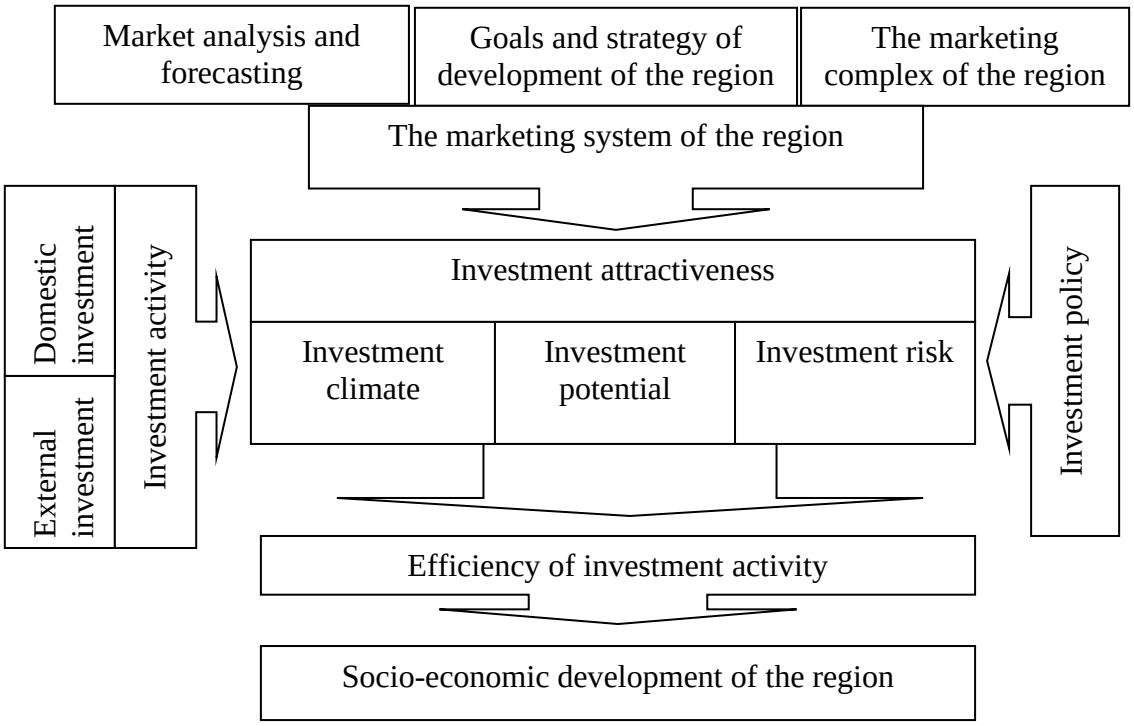

Fig. 1. The relationship between the marketing system and investment attractiveness of the region

Source: systematized by the authors

In recent years, foreign investment in Ukraine has been growing at an impressive rate. Statistics for the last few years show a steady increase in foreign direct investment in the economy of our country, although, according to experts, the volume and pace of foreign capital investment has declined slightly. Given the refusal to import energy from Belarus and Russia, the search for ways to provide the Ukrainian economy with alternative sources of energy resources is necessary in the short term. One of the fastest solutions is to use the existing potential of agriculture to produce biofuels from its own raw materials. The use of advanced technologies for growing and processing agrobiomass into alternative energy sources can be achieved in the short term, but the

question arises of building effective marketing relationships in agricultural formations focused on biofuel production. Development of an effective marketing model in the field of processing agrobiomass into alternative energy sources is a necessary component of ensuring Ukraine's energy security.

Goncharuk I.V. is devoted to scientific problems of creation of effective mechanisms of cultivation and processing of agrobiomass in modern conditions. [123], Logoshi R.V. [115, 118], Shevchuk G.V. [117], Brich V.O. [119], Krasnoselskaya A.A. [120], Vovk V.Yu. [122, 123], Tokarchuk D.M. [125, 132], Mazur K.V. [138] and others. However, the creation of effective marketing models for the interaction of agro-industrial producers focused on biofuel production in the context of rising energy prices on the world market and refusal to supply hydrocarbons from the aggressor country is extremely necessary, which determines the relevance of this study.

The growing popularity of the production of alternative energy sources in Ukraine and the shortage of conventional energy resources in the EU and Ukraine markets create favorable conditions for the development of biofuel production. The formation of marketing models for the interaction of agricultural enterprises in the field of biofuel production is necessary to ensure the replacement of fossil energy sources.

The development of these models should be planned in accordance with Ratmela's model, which indicates that in the manufacturing sector it is possible to distinguish at least three, albeit related, but completely independent processes:

1) the process of production of goods;

2) the process of marketing these goods;

3) the process of consumption of these goods [115].

Today there are studies Semchuk IA who showed that the modeling of partnership in the system of agents (enterprises) focused on biofuel production has a clear specificity of the domestic agricultural sector, industry, features of the biofuel business, etc., which determines the peculiarity of the problem. The essence of the latter is to simulate the reaction of potential agents (firms) to participate in business in the presence of relevant information about some motivations (motivational factors), still unknown in the market [116, p.4 9].

According to Semchuk IA, the solution of the problem of modeling a successful business in the production of biofuels should cover:

1) interests and potential of agricultural enterprises-producers of biofuels (interests of the enterprise-initiator – IPI);

2) the interests of potential business recipients, given the potential for the formation and implementation of partnerships (interests of recipients / potential partners – IP).

Such a model is dynamic in nature and should reflect changes in the mood of many companies focused on cooperation in the field of biofuel production. The corresponding change of mood depends on:

1) the intensity of information links on the benefits and risks of cooperation;

2) the existence of a system for implementing motivational factors for IP.

Experimental studies of Logosha RV, conducted in 2020, which involved about 15% (251 people at the 1st stage and 235 people at the last stage) of agricultural managers by demonstrating their intentions (in the form of a questionnaire) on a range of issues, which were somehow related to the attractiveness of business and biofuel products. At each stage, this information was clarified / changed in order to record how the interviewers' views on the quality of the specific change changed. The range of types of farms was quite wide and covered both small (from 3 hectares) and medium and large enterprises (up to 30 thousand hectares). All enterprises were typical for economic activity – developed crop production with elements of animal husbandry (cattle and pigs) [116, p.49]

Table 1

Meaningful interpretation of the experiment

Stages Temporal fixation Linguistic expression	Stages Temporal fixation Linguistic expression	Stages Temporal fixation Linguistic expression	Stages Temporal fixation Linguistic expression	Stages Temporal fixation Linguistic expression
I	…	Do you consider it important to diversify the activities of your company	1687	251
II	Approximately	How attractive for you is the business of producing biofuels and biofuels as a commodity	251	250
III	in 5 days	If quality standards for biofuels are developed and implemented in the biofuels market – how attractive will be for you the business of biofuels and biofuels as a commodity	250	248
IV	Approximately in 30 days	Will you take part in the biofuel business if a separate marketing partnership policy is developed (with a detailed interpretation of such policy)	248	241
V	Approximately in 30 days	Similar to the previous question, taking into account the time factor	241	235

Source: [116, c. 49]

According to the study, about 70% of managers intended to develop a model of diversification for their company, given that, according to questionnaires, traditional activities have recently shown a steady decline in profitability. At the same time, only 5% of agents indicated their initial intentions to start a biofuel business (as well as how to consume biofuels on their own farm), while 15% could be interested in certain conditions. That is, it can be argued that the Ukrainian biofuel business itself (with experience gained during 2005-2020) has no prospects due to the negatives of such experience [116, p.52].

It should also be noted that according to Shevchuk G.V. the main directions focused on improving the production and processing of agricultural products for biofuels should be:

- compliance with rational crop rotations in the cultivation of crops;

- creation of small and medium-sized processing enterprises focused on providing services for processing oilseeds into biodiesel and cake in order to provide highly concentrated feed to the livestock industry;

- creation of state programs to support the development of solid biofuel production in private farms by compensating for the purchase of granulators of crop residues (straw, husks, etc.) productivity of 50-100 kg per hour;

- modernization of sugar factories by creating production clusters whose products will be – sugar, biogas, bioethanol, electricity and digestate;

- creation of biogas productions on the basis of livestock complexes as auxiliary productions focused on electricity production or sale of purified biogas of biomethane extract with further sale in the gas transmission system;

- the use of digestate to increase crop yields as a way to improve the production of agrobiomass for further processing;

- reorientation of privatized distilleries to bioethanol production [117].

Industrial production of agricultural biofuels

Today in the Sakhnovshchina district of the Kharkiv region. The Institute of Sustainable Development has established an energy cooperative that produces biofuels for its own needs. The cooperative was established during the next increase in the retail price of diesel fuel almost twice. The Institute then proposed an experiment: 12 small and medium-sized agricultural enterprises merged to produce biodiesel, which significantly reduced the cost of agricultural products they produce. Agricultural enterprises have singled out plots from their own land bank, the area of which is proportional to their own needs in biodiesel, which are sown with rapeseed. To purchase equipment for biofuel production, the cooperative participated in a grant competition (from the United Nations Industrial Development Agency (UNIDO)). As its own contribution, the company built a hangar for the production and storage of biodiesel [125, p. 169].

In our opinion, the lack of experimental research in the field of biofuel production by agricultural enterprises should be solved by creating research and

production laboratories on the basis of research institutions.

For example, on the basis of the Research Laboratory of Bioenergy of the Training and Research Center of VNAU is the study and practical implementation of best practices in the production of bipal fuel, as well as advice on the production and use of biofuels to educational and research institutions in the region. In-depth research in the process of biofuel production by creating design documentation for biofuel production can serve as an incentive to establish biofuel production.

Today, within the scientific activity of Vinnytsia National Agrarian University, it is planned to implement the startup "GreenDiesel" to create a cooperative for the production of biodiesel, which contributes to:

- biodiesel plant is already available, there is no need for additional investment;

- startup participants are scientists who will provide a scientifically sound production process and its improvement in order to optimize and reduce production costs;

- a strong base of scientists from Vinnytsia National Agrarian University, who study the problems of improving the efficiency of biodiesel production from different types of raw materials, is available;

- to carry out research at Vinnytsia National Agrarian University there is a laboratory for the use of bioresources in biotechnologies for alternative fuels (conclusion of the state sanitary-epidemiological examination TU U 24.1-2433016356-002: 2006 "Diesel fuel. Methyl fatty acid esters") Dnipropetrovsk region, from 13.07.2006 №05.03.02-07 / 33139), material and technical base and capacities of the Research Farm "Agronomic" VNAU, NNVK "All-Ukrainian Training and Production Consortium", as well as scientific and measuring agrochemical laboratory.

Creation of similar research and production laboratories will allow:

- to conduct a visual demonstration of production to potential producers of biofuels;

- to modernize the existing production lines in accordance with the needs of individual farms (design of lines of different production facilities and focus on raw materials of the customer equipment, etc.).

In addition, according to Logosha RV The development of the domestic biofuel industry requires a special protectionist policy, which will include:

- introduction of stimulating financial and economic instruments;

- abolition or significant reduction of excise tax rates on biodiesel and its mixtures and motor fuels containing bioethanol;

- elimination of the need to file a tax bill for bioethanol producers;

- formation of guaranteed demand for motor biofuels (for example, establishment of market quotas and schedule for increasing the share of biofuels in total fuels), or providing state support (subsidies) to businesses operating in the field;

- implementation of mandatory sustainability criteria into Ukrainian legislation, compliance with which is currently voluntary, which will ensure the environmental friendliness of motor biofuels and reduce emissions into the atmosphere;

- completion of the process of harmonization with the relevant EU norms;

Abolition of exclusive rights to produce petrol with the addition of bioethanol and / or its components, which hinders the development of competition and leads to a shortfall in Ukraine's potential benefits from duty-free biofuel exports to the EU under the relevant quotas [118, p. 8].

The development of pellet production lines is quite new for agricultural producers focused on the production of biofuels. Raw materials for which can be crop waste (straw, wood chips, leaves, etc.).

According to Brich V. in many European countries, pellets are the main fuel for cottages and country houses, and therefore most of this fuel is currently exported to Europe. In Ukraine, there are untapped opportunities to expand the market for biofuels, the use of fuel pellets for heating in boilers and fireplaces, for heating private homes, as well as in boiler houses and utilities. Thus, the domestic market for biofuels can be attributed to promising markets. In addition to prospects, there are negative factors and risks of the biofuel market. These are economic, political and technological factors. The development of this area may well be very promising. As a rule, biofuels are used as a substitute for traditional energy sources. The level of biofuel prices directly depends on changes in the oil, gas and coal markets. Rising prices for petroleum

products and coal make biofuels more profitable. Conversely, when the price of traditional energy sources decreases, the prices for biofuels will also decrease [119, p. 134].

According to Krasnoselskaya A.A. positive environmental effect of biofuel production is the safe processing of organic waste and animal by-products due to methane fermentation. 5 main ecological effects from the introduction of biogas complexes in agricultural enterprises are identified:

1) use of crop and livestock waste as secondary raw materials to ensure energy autonomy;

2) solving the problem of storage and transportation of raw materials;

3) reduction of fossil fuel use, resource conservation and

introduction of alternative energy sources;

4) the use of digestate as an organic fertilizer to increase soil fertility;

5) reduction of greenhouse gas emissions [120, p. 83].

In addition, there are problems in the regulation of biofuel production. So Platonova EA notes that, in addition to the overall positive direction of fiscal policy in the bioenergy sector, it has significant shortcomings and miscalculations. This concerns the abolition or temporary restriction of many tax and customs benefits in the field of bioenergy, which contradicts the general direction of state policy to encourage the use of biofuels. Insufficient attention is paid to financial support of biofuel production. An example of this is the lack of any compensation for interest rates on loans raised to cover the cost of purchasing equipment for processing agricultural waste and raw materials, waste timber (including biofuels and other alternative energy sources). The most successful and optimal organizational and legal form of production and supply of biofuels is the establishment of energy cooperatives in the country. Promising areas for modernization of organizational state support for bioenergy in Ukraine are: the formation and operation of electronic markets for biofuels, biomass; introduction of a competitive thermal energy market; providing state support to economic entities that grow energy crops; exemption from paying tax on CO^2 emissions of biofuel combustion plants, etc. [121, p. 120]

Achieving the main goal of the European Green Course will require action by all sectors of our economy, including:

- investing in environmentally friendly technologies;
- support for innovation in the industry;
- decarbonisation of the energy sector;
- cooperation with international partners to improve global environmental standards [122, p. 199].

The use of innovative, environmentally friendly and economically sound technologies by enterprises contributes to the gradual growth of economic efficiency of production. Ecologically oriented effective system of ecological management at the enterprise will ensure the formation of balanced development of both the enterprise and society as a whole [123, p. 161] .

According to Furman I.V. Improving investment and innovation activities in the agricultural sector requires improving existing mechanisms for attracting investment. Investments in the agricultural sector will allow the introduction of innovative developments in agriculture [124, p. 46].

In addition to solving these problems in the field of biofuel production, there is a problem with the promotion of relevant products on the market. First of all, the production of biofuels by agricultural enterprises will focus on meeting the energy needs of these formations. The production of biogas at these enterprises will require the establishment of contacts for the sale of surplus products in the general GTS or processing into electricity and sale at a "green tariff". However, lowering the green tariff rate for new producers will not help convert biogas into electricity. The sale of biogas in the GTS will require the conclusion of contracts for the sale of this type of product. It is most expedient to sell biogas to industrial enterprises focused on the export of their products. In this case, companies will not pay carbon tax when exporting their products and biogas is projected to have a higher price compared to natural gas.

An additional effect should be considered the production of digestate, which in the absence of organic fertilizers should be used to fertilize the soil, which will have a positive impact on crop yields. However, in the future it is necessary to take measures

to promote solid biofuels on the market, which will require the development of cooperation with retail chains and the establishment of a supply system. It will be necessary to develop measures to promote products and manufacture pellets in packaging focused on single sales, which will be problematic for some manufacturers due to the need for additional costs. Therefore, the most appropriate will be the implementation of wholesale batches for district heating boilers near the immediate sites of production of solid biofuels (pellets).

Thus, marketing of interaction of agricultural enterprises focused on biofuel production, in our opinion, should be considered as a process of building, maintaining and expanding strong long-term, mutually beneficial relationships with key partners, customers, suppliers, distributors, staff, government and others.

An appropriate marketing model for the interaction of agricultural enterprises focused on biofuel production should include interaction on the basis of public-private partnership of research institutions and relevant enterprises focused on biofuel production (Fig. 1).

The relevant model should include the following measures for the production and promotion of biofuels on the energy market:

- public-private funding of research in scientific institutions in accordance with the needs of the enterprise (design of biogas, biodiesel and other industries in accordance with the needs of enterprises);

- training of employees who will be involved in the production of biofuels at an agricultural enterprise in a scientific institution;

- conclusion of agreements with enterprises focused on the production of equipment developed by scientific institutions for the production of biofuels;

- compensation of interest by the state budget for the purchase of equipment for the production of biofuels by agricultural formations;

- transfer of biofuels to ensure the main production (fuel – biodiesel for equipment and heating of own productions and production facilities – biogas, pellets);

- transfer of by-products from the production of biofuels (digestate, rapeseed cake, soybean, etc.) for use as animal feed and organic fertilizers for crops;

- establishing cooperation with buyers of biofuels (industrial enterprises - biogas, enterprises for hot water supply – pellets, gas stations – biodiesel).

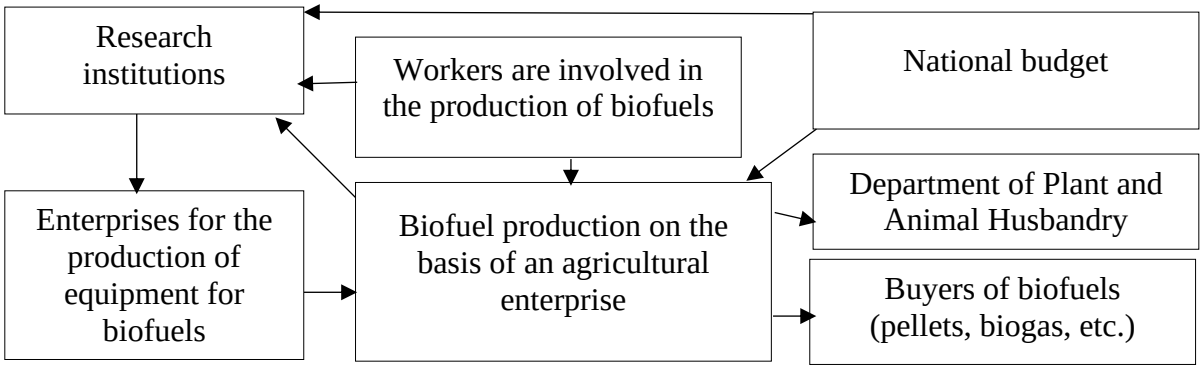

Fig. 1. Model of marketing interaction of agricultural enterprises focused on biofuel production

Source: own development

Thus, the practical implementation of this model will partially reduce the energy independence of the state from petroleum products, increase the efficiency of agricultural enterprises, provide the crop industry with organic fertilizers and livestock with concentrated feed (cake as a by-product of biodiesel from oilseeds). equipment for biofuel production.

Today, Ukraine owns large areas of land, but their potential, especially in the field of biofuel production, is used to a small extent. In the conditions of partial destruction of infrastructure and logistical ways of export of agricultural products due to the military invasion of the Russian Federation, it is necessary to resolve the issues of processing of agricultural products within Ukraine. In the context of rising energy prices, special attention should be paid to establishing biofuel production.

As noted by Kaletnik GM the total potential of bioenergy production from 10 million hectares of land of the state may be more than 28.99 million toe. (Table 2).

Without threatening the food security and export potential of the state, about 10 million hectares of agricultural land can be used for growing energy crops with further processing into biofuels, to ensure energy independence of the agro-industrial complex and Ukraine. That is, the potential of our country for the cultivation of energy raw materials and biofuel production is quite high [126, p. 11].

However, it should be noted that currently the potential of straw from growing crops in the form of straw and waste from oil refineries is used to a small extent, which can significantly increase the production of solid biofuels in the short term.

In the conditions of refusal of import of energy from the Russian Federation today ways of supply from the EU countries are adjusted.

However, the purchase of natural gas and gas oils in the face of rising prices on the EU market is quite expensive, so it is necessary to develop ways to improve the cultivation and production of agrobiomass for biofuels, including biogas and biodiesel.

Table 2

Calculation of bioenergy production in Ukraine taking into account changes in new technologies and crop rotations

Culture	Square growing	Crop capacity, t / ha	Fuel output, from 1 t of raw wine Fuel output, from 1 t	Fuel output, from 1 t of raw wine Fuel output, from 1 t	Fuel output, from 1 t of raw wine Fuel output, from 1 t	Fuel output, from 1 t of raw wine Fuel output, from 1 t	Entrance Fuel total, million i.e.
Bioethanol							
Sugar beets	1,5 million hectares	60,0	100	0,079	0,051	3,06	4,59
Corn	1,5 million hectares	7,0	416	0,329	0,211	1,48	2,22
Wheat	1,0 million hectares	5,0	395	0,312	0,20	1	1
Biodiesel							
Rapeseed	2,0 million hectares	2,5	420	0,36	0,31	0,78	1,56
Soy	1,0 million hectares	2,2	200	0,17	0,15	0,33	0,33
Biogas							
Silos corn	2,0 million hectares	40	180 m^3	-	0,15	6	12
Pulp sugar beets	Sugar beet growing area (1.5 million hectares)	19	120 m^3	-	0,08	1,52	2,28

Continuation table 2

Solid biofuels							
Energy poplar, Energy willow	0,5 million hectares	14 dry matter.	-	-	0,43	6,02	3,01
Miscanthus, switchgrass	0,5 million hectares	10 dry matter	-	-	0,4	4,0	2,0
Total potential of bioenergy production from 10 million hectares, million toe							28,99

1 liter of bioethanol – 0.79 kg

1 liter of biodiesel – 0.86 kg

1 ton of bioethanol – 0.64 t.e.e.

1 ton of biodiesel – 0.86 so-called

1 thousand m3 of biogas – 0.812 so-called

Source: [126, p. 12]

According to the Ministry of Finance of Ukraine, as of the beginning of 2022, quite significant reserves of fuel resources were formed (Table 3).

Table 3

Use and stocks of fuel products in Ukraine in 2021

	Used for 2021		Balances at 1.01.2022
Coal	thousand tons	39164,5	1394,8
Natural gas	million m³	28740,2	13517,3
Gasoline	thousand tons	374,7	132,7
Gas oil	thousand tons	4188,2	330,0
Fuel oil	thousand tons	187,3	78,8
Propane and butane are liquefied	thousand tons	252,1	19,3

Source: generated by the author based on [127]

Today, on the basis of research and production facilities of the All-Ukrainian Research and Training Consortium, a research and production laboratory focused on improving agrobiomass cultivation and providing services for processing energy crops into biodiesel and prototyping plants for biogas production by private farms. Today, the existing laboratory is undergoing a process of modernization, including in the production cycle equipment for processing energy crops into oil and cake, improving the technology of growing relevant crops and developing prototypes of small biogas plants. The developed and calculated chain of soybean processing into cake and biodiesel is presented in Fig. 2.

According to calculations, the cost of soybeans is set at the market price in 2022

– 17,600 UAH / t, transport costs are set at 30 UAH / t.km, the cost of processing will be 800 UAH / t. The total production costs will amount to UAH 21,156. The planned output of biodiesel will be 200 liters, for the production of which an additional UAH 1,756 will be invested. The cost of selling by-products will be UAH 14,400. The cost of 1 liter of biodiesel will be 33.78 UAH / kg.

This laboratory is focused on the processing of oilseeds for the needs of agricultural enterprises that are members of the All-Ukrainian Research and Training Consortium. This makes it possible to reduce the cost of production on the consortium's research farms, as well as clearly demonstrate to potential customers, which can be both small and large agricultural enterprises to argue the benefits of processing oilseeds for biodiesel and cake.

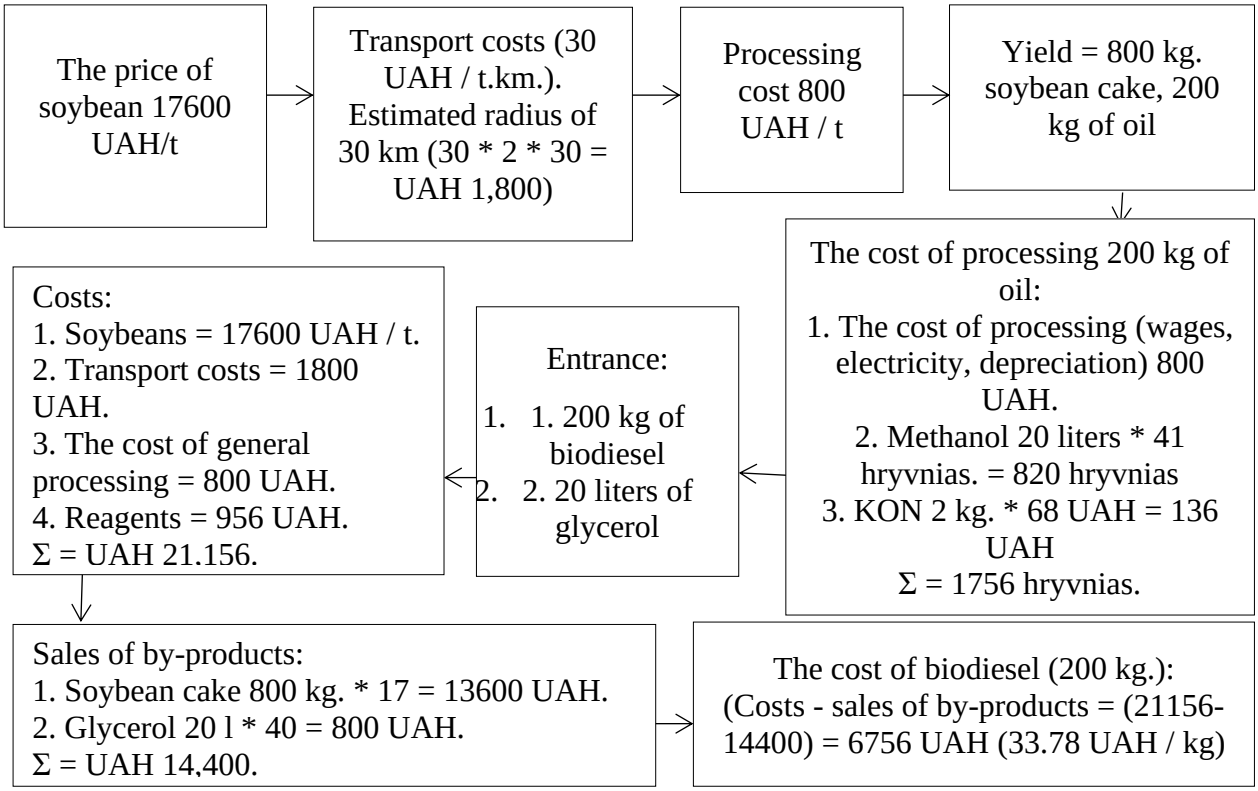

Fig. 2. Calculation of economic feasibility of processing soybeans into biodiesel.

Source: [117]

It is planned to use the scientific and practical experience of Vinnytsia National Agrarian University in the field of biodiesel production to develop design and estimate documentation for the creation of prototypes of productions focused on the production of biofuels. Appropriate production prototype should be used for visual demonstrations

of the effectiveness of this type of oilseed processing for potential members of cooperatives and investors.

According to Goncharuk IV, the main obstacles to the development of biofuel production there are the following:

- for the most part it is not economically viable for farms to produce biofuels, preference is given to the export of raw materials;

- lack of financial incentives for the implementation of bioenergy projects;

- high level of risks for potential investors;

- deficit of own funds of Ukrainian companies, their low financial capacity and high cost of bank lending;

- insufficient funding for research and implementation of new technologies [128, p. 128].

Creating an appropriate organizational and economic mechanism for processing agricultural products requires a number of tasks that will overcome the above obstacles to the development of this activity:

In-depth research in the field of creating a closed cycle for oilseeds processing on the basis of NNVK "All-Ukrainian Scientific and Educational Consortium" is aimed at;

1. Economic substantiation on the basis of the conducted experimental researches of expediency of creation of processing manufactures focused on production of biofuel from agrobiomass:

2. Development of design and estimate documentation for the organization of processing of oil of different crops into biodiesel.

3. Development of directions for improving the state program for the development of service cooperatives with the provision of state subsidies for biofuel production.

The organizational and economic mechanism for the development of agro-industrial enterprises for the production of biodiesel should include measures to develop design documentation for a prototype of a closed cycle for processing oilseeds for biodiesel and bards and other waste for biogas. Creation of a universal business

plan for the operation of processing plants to provide services for the production of biodiesel for the production needs of agricultural formations. Development of recommendations for improving state support programs for energy cooperatives. Development of a set of measures focused on the production of biofuels from biomass.

One of the new directions in the development of processing in the agro-industrial complex should be the development of energy cooperation in rural areas to process straw and other organic residues to provide the rural population with fuel for heating homes.

According to open data, the level of overproduction of straw in Ukraine, which can be used in energy, reaches more than 32 million tons, which is more than 16 million tons of energy equivalent of coal. These statistics show that the energy use of straw can be a strategic element in increasing the energy independence of Ukraine's economy.

Energy use of excessive straw production would reduce natural gas imports by 12 billion m3 of gas per year. Possible savings across Ukraine could be $ 4 billion a year. In addition, the implementation of activities related to the production of thermal energy from straw, allows the use of labor, which is concentrated near the source of raw materials, which in turn can help improve living standards among rural residents. It should be noted that measures related to the energy use of straw are supported by funds allocated by the European Union for environmental protection, air protection, as well as the creation of new professions in development programs [129].

Similar enterprises already operate in Ukraine today. Block-modular boiler plants are the most important area of production of individual enterprises. Fully automated hot water boilers with heat output from 0.25 to 12.6 MW are designed on the technological basis of hot water boilers.

The only resource that is used almost completely is sunflower husk at oil refineries. All processing plants for the production of sunflower oil by burning the husks partially provide themselves with thermal energy, and for example PJSC "Vinnytsia Oil and Fat Plant" is currently implementing a project to create its own CHP to generate electricity and sell it to the general network. Today, the husk is granulated or briquetted at this enterprise and sold for export (additional income from such exports

in Ukraine as a whole – up to $ 20 million per year).

S. Degodyuk calculated the approximate yield of straw in the cultivation of certain types of cereals (Table 4).

Table 4

Output of straw and other postharvest residues

Culture	Conversion factor for straw
Winter and spring wheat	1,6
Winter wheat and spring	2,0
Winter and spring barley	1,3
Oat	1,5
Corn for grain	1,6
Millet	1,5
Buckwheat	3,0
Fig	2,0
Sunflower	2,0
Rapeseed	2,0
Soy	1,5

Source: formed on the basis of data [130].

According to statistics, the area of agricultural crops in Ukraine is over 28 million hectares. (Table 5). Of these, more than 8 million hectares are cultivated by households, which makes it possible to state the fact that private farms have the appropriate resource base for the production of solid biofuels (straw, sunflower husks and corn, etc.).

The energy use of straw is less than one percent, and for corn and sunflower waste (excluding husks), the corresponding use today is negligible. Thus, energy-dependent Ukraine does not use fuel resources with an estimated cost of 3–4 billion US dollars.

As of 2022, a significant number of settlements, especially in rural areas, are non-gasified villages. The cost of gasification is significant and for some rural communities is unaffordable, so it is advisable to find alternative sources of heating. The establishment of processing plants for the production of pellets from agricultural waste can be a solution to the problem of heat supply for these settlements.

Table 5

Sown areas of agricultural crops for the harvest of 2021, thousand hectares

	Farms of all categories		Enterprises		Households	
	2021	2021 in% 2020	2021	2021 in% 2020	2021	2021 in% 2020
Agricultural crops	28387,5	100,9	20010,9	101,5	8376,6	99,5
Cereals and legumes	15943,9	103,6	11740,5	104,4	4203,4	101,5
wheat	7099,6	107,6	5432,0	108,8	1667,6	103,9
winter wheat	6907,5	107,5	5297,2	108,5	1610,3	104,2
spring wheat	192,1	115,1	134,8	125,3	57,3	96,6
corn on the cob	5474,8	100,8	4390,9	100,9	1083,9	100,5
barley	2474,5	103,3	1324,6	106,0	1149,9	100,4
winter barley	1137,5	111,0	880,8	114,6	256,7	100,2
spring barley	1337,0	97,6	443,8	92,3	893,2	100,4
rye	175,3	126,9	119,8	145,2	55,5	99,8
winter wheat	174,2	127,1	119,3	145,0	54,9	100,2
wheat goat	1,1	101,1	0,5	198,0	0,6	71,6
triticale	10,4	99,6	10,4	99,6	–	–
winter triticale	9,7	101,9	9,7	101,9	–	–
triticale spring	0,7	75,6	0,7	75,6	–	–
oat	177,9	89,1	55,2	79,2	122,7	94,4
buckwheat	84,0	100,0	46,5	100,2	37,5	99,8
sorghum	42,8	87,5	32,4	83,5	10,4	102,6
millet	78,1	49,1	55,6	41,8	22,5	86,1
Fig	9,9	88,3	9,9	88,3	–	–
legumes	314,6	99,7	261,4	99,5	53,2	100,8
bean	48,3	99,4	14,6	99,6	33,7	99,3
pea	242,1	101,3	224,4	101,0	17,7	104,4
vetch	2,7	79,2	2,1	75,1	0,6	98,6
sweet lupine	3,5	70,5	3,3	69,8	0,2	85,4
Technical crops	9106,6	98,7	7782,7	98,5	1323,9	100,4
Soy	1280,3	94,8	1096,9	94,0	183,4	99,7
Winter rape and colza (spring rape)	1009,5	89,6	996,3	89,5	13,2	96,0
winter rape	975,9	89,1	963,3	89,0	12,6	96,0
colza (rape spring)	33,6	107,7	33,0	107,9	0,6	95,5
Sunflower	6509,7	100,8	5404,5	100,8	1105,2	100,6

Dzherelo: formed on the basis of data [131].

The agro-industrial complex is used especially in the rural area in order to achieve great obligations, but it is not suitable for sleeping in the ovens and boilers in non-gasified settlements. The creation of cooperative molding plants for converting straw into pellets can be one of the direct solutions to the problem.

Variation of one line from the production of pellets for a given hour to become 1.07 million UAH. On the balance sheet of the largest number of rural people, they are glad to transfer unsolicited accommodation, in which it is possible to place such lines, so that the line itself for the support of the communities of forces does not exceed 1.2 million hryvnia. The delivery of the syroviny can be supported by the transport of the sylskogospodarsky enterprises, which function in the borders of the forces and will act as post-employees of the syroviny, which will allow minimizing the variability of the syroviny [132, p. 110].

Rinkova variety of pellets from straw on this day is kolivaetsya in the boundaries of 6 yew. hryvnia / t, with the creation of a cooperative, yoga members can take such a cost for a price of 2–3 thousand. UAH for 1 ton iz minimum delivery charges. Aje lines from the production of pellets will be distributed near the villages themselves. Tobto one housekeeping, as a contribution to the establishment of the cooperative is close to 5–7 thousand. hryvnia can be repaid on an environmentally friendly solid fire for a maximum price of 3 thousand. UAH for 1 ton with delivery.

A study was carried out near the area of dry straw scalding, which resulted in the energy efficiency/energy value of scalding becoming 15 megajoules per 1 kg. The average has 2 kg. straw cost about 1 kg of wood per energy capacity. Straw is a source of thermal energy, the technology of which has already been well implemented, as well as the technology of victoria for spitting firewood, wood, wood, briquettes too thin. Also, 2 t. UAH [132, p. 110].

For efficient burning of straw pellets, households in rural areas can switch to scorching with more modern solid-fired boilers, the price for scalding is between 25-30 yew. hryvnia, which is more expensive, lower gas, but does not require additional deposits for connection to gas lines and can be drunk automatically on hard-burning briquettes.

Okrim of that special rural state can often or even more securely use water for firewood for heating for independent processing of straw and other grates from the wet farming. On this year, we will drink automatic presses for the production of pellets, the number of such pellets is 12 thousand UAH up to 30 thousand. hryvnia present on the

market manual press varty 1.5–2.5 ths. UAH per unit. For the help of some, it is possible in the home minds to make hard-burning briquettes from the straw of cereals and leguminous crops and fallen leaves.

Let's consider the biodiesel production and hard-burning briquettes necessary for the development of biogas production, especially for blood and alcohol plants.

Tokarchuk D.M. The relevance and potential for the development of technology of non-excessive production, the promotion of which significantly change the product compatibility and increase the profitability indicator, stimulate the development of autonomous production, improve the environmental and energy efficiency, are outlined. It has also been established that the conversion of organic inputs into wastes and savings from biogas plants is economically and environmentally optimal solutions. The products (biogas, biofertilizers) formed as a result of waste disposal help to solve the problem of meeting the needs of certain categories of material resources, namely energy and fertilizers, which will increase production while reducing the use of natural resources [133, p. 61].

Yak nominates Goncharuk I.V. є economical production of biogas from the output of the agricultural state, agriculture, output of the animal kingdom. It has been established that in order to ensure the energy independence of enterprises and the possibility of using biogas in the rainwater systems for transport or transmission in the gas transmission system, it is necessary to carry out the so-called modernization, or as much as possible completely clear the houses (air water and carbon dioxide). Instead of methane, it is necessary to bring it up to the level of natural gas (95-99%), after which gas can be taken away, it can be transferred to the gas-discharge zone, which is more accessible to achieve energy and environmental safety [134, p. 37].

The efficiency of biogas production from production outputs is presented on the basis of the practical functioning of the biogas complex (TOV "Organik D") as an additional production on animal farms with an intensity of 1000 tons, giving the possibility of surpluses for 6 UAH and 1.9 million UAH for a pig farm for dairy farms (tab. 6). Orientation compatibility of production of 1 thousand m3 of biogas to become 13.2 thousand. hryvnia and 11 ths. UAH for 1 thousand. m3 vidpovidno. In the process

of purification of biogas from CO2 (total biomethane in biogas to become approximately 60%) and the sale of biogas to the gas transport system of Ukraine, the price of the mill on the cob in 2022 was 54 ths. UAH/m^3.

Table 6

Efficiency of biogas production from cattle and pig manure

Type of raw material	Volume of processing, t	Entrance biogas from 1 t raw materials, m^3	Gross output biogas, thousand m^3	Cost of the received biogas, 1 thousand m^3 thousand UAH	Gross profit, thousand UAH	Net profit, thousand UAH
Pig manure	1000	60	60	13,2	1944	1115,2
Cattle manure	1000	50	50	11	1620	1070,0

Source: own research based on [133, 134]

To date, the Law of Ukraine "On Amendments to the Law of Ukraine" On Alternative Fuels "for the Development of Biomethane Production" No. 5464 of 05.05.2021 has been adopted in the legal field. The law has solved two main tasks:

1. Introduces into the legislative field of Ukraine the definition of the term "biomethane" – a biogas that in its physical and technical characteristics meets the regulations on natural gas for supply to the gas transmission and distribution system or for use as motor fuel;

2. Creates the "Biomethane Register" – an electronic system of accounts designed to register the amount of biomethane submitted to the gas transmission or gas distribution system and selected from the gas transmission or gas distribution system, as well as to form guarantees of biomethane origin, their transfer, distribution or cancellation and cancellation biomethane [135].

According to Furman IV, the implementation of the program "Roadmap for the development of bioenergy in Ukraine until 2050 and the Action Plan until 2025" should be complemented by the following measures to encourage state owners and tenants to use biofuel production technologies:

- concessional lending for the purchase of equipment for the production of biofuels;

- granting the right of priority lease of state lands for agricultural purposes to enterprises and farmers focused on the production of biofuels;

- providing state subsidies for in-depth research in the field of biofuel production to research institutions [136, p. 64].

At present, it is quite necessary to modernize sugar factories focused on biogas production, followed by in-depth modernization to create alcohol production (Fig. 3).

Creating a kind of production cluster based on sugar in the direct sugar plant, biogas plant, thermal power plant and distillery will allow:

- reduce the cost of sugar production because through the use of its own biogas you can give up expensive natural gas;

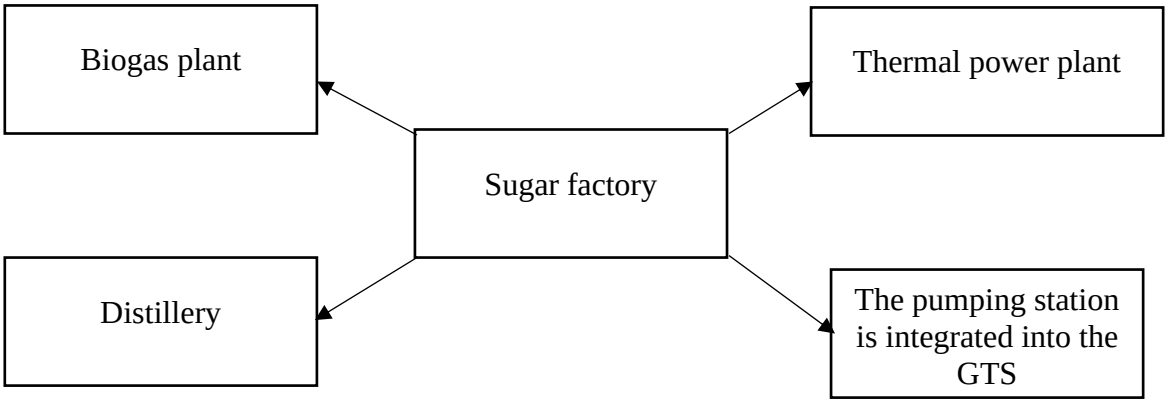

Figure 3. Schematic diagram of a production cluster based on a sugar factory

Source: [117]

- to process waste from sugar factory (molasses and pulp) and alcohol (bard) for biogas and some waste from crop products (straw, husks, etc.);

- reduce the cost of alcohol production through the use of excess thermal energy from its own thermal power plant (CHP);

- to minimize wastewater pollution from alcohol and sugar production of the environment.

- to provide agricultural enterprises with high-quality organic fertilizer – digestate (the use of which will increase the yield of agricultural crops, including sugar beet and sunflower).

It is expedient to partially reorient privatized distilleries to bioethanol production, which is a rather profitable investment project for new owners of privatized

enterprises in the conditions of rising gasoline prices and the requirements of the legislation which provides for mandatory addition of bioethanol to gasoline.

The commissioning of biogas plants at the enterprises of the alcohol industry is an urgent issue for the strategic development of the regions. The proposed measures will allow:

1. Increase the profitability of the alcohol industry;

2. Increasing revenues to the state budget from enterprises of state enterprises in the industry;

3. Growth of investments in the industry;

4. To increase the gross regional product and the profitability of the industry as a whole [137, p. 38].

At the same time, the production of biogas at distilleries in the region will be able to give the following effect to the economy:

1. Increase the energy independence of the regions;

2. Reduce the cost of distilleries for energy;

3. To improve the ecological condition of water resources of regions;

4. Reduce greenhouse gas emissions.

5. Provide the livestock industry with protein feed.

The main deterrent to the development of biogas production at distilleries was primarily the reluctance of leaders and the state to improve production. By stimulating the development of alternative energy and increasing penalties for emissions from the waste industry, it is possible to stimulate this process [137, p. 38].

Therefore, the main directions focused on improving the production and processing of agricultural products for biofuels should be:

- compliance with rational crop rotations in the cultivation of crops;

- creation of small and medium-sized processing enterprises focused on providing services for processing oilseeds into biodiesel and cake in order to provide highly concentrated feed to the livestock industry;

- creation of state programs to support the development of solid biofuel production in private farms by compensating for the purchase of granulators of crop

residues (straw, husks, etc.) productivity of 50-100 kg per hour;

- modernization of sugar factories by creating production clusters whose products will be - sugar, biogas, bioethanol, electricity and digestate;

- creation of biogas productions on the basis of livestock complexes as auxiliary productions focused on electricity production or sale of purified biogas of biomethane extract with further sale in the gas transmission system;

- the use of digestate to increase crop yields as a way to improve the production of agrobiomass for further processing;

- reorientation of privatized distilleries to bioethanol production.

It is currently necessary for personal farms to use the appropriate equipment for self -support of their own heat supply needs (Fig. 4).

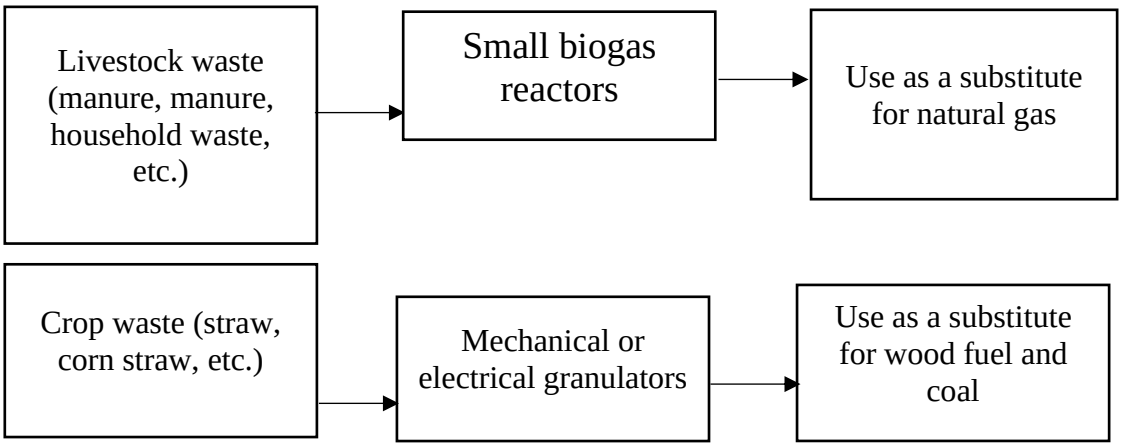

Figure 4. Schematic diagram of the processing of agricultural waste in private farms for biogas and solid biofuels

Source: [138]

Creation of the corresponding auxiliary productions will give the chance:

- reduce Ukraine's dependence on imported energy;

- to carry out processing of waste from own production and vital activity of personal peasant farms;

- provide subsidiary farms with granulated feed;

- minimize the cost of heating homes.

- to provide personal farms with high-quality organic fertilizer – digestate (the use of which will increase yields in homesteads).

To achieve competitive advantages in the grain markets, it is advisable to combine and use two types of marketing strategies: specialization and diversification. A combination of marketing, sales, production, organizational, financial and diversification strategies is proposed for individual sub-sectors. With their optimal use, the level of supply and consumption of domestic pasta and bakery products will increase significantly.

Implementation of the proposed directions of development of grain production and processing in Ukraine will allow:

- to provide agricultural producers with modern elevators for storing grain crops and reduce their losses during storage;

- increase the production of durum wheat and provide its own flour-milling and baking industry with high-quality domestic raw materials;

- reduce the price of flour in local markets through the development of small flour mills;

- to ensure the processing of feed grain in modernized distilleries focused on the production of bioethanol;

- reduce the energy independence of the state through the use of bioethanol as an additive to gasoline.

In the complex, the implementation of the proposed measures will significantly increase the competitiveness of grain products on world markets, maximize the profits of agricultural producers, increase state GDP and reduce dependence on imported energy.

The development of appropriate industries in the future will allow you to implement experience in the activities of territorial communities in order to heat budget buildings. In addition, the burning of fossil energy sources is the main source of greenhouse gas emissions that cause a climatic crisis. Therefore, to overcome the problem with infrastructure development of rural territorial communities, you should choose the purest and most appropriate alternatives. It would be advisable to organize their own production of fuel briquettes (pellets) of organic raw materials (straw, waste of corn, shrubs, reeds, other wood waste – trimmed branches, cods, etc.) by local

governments in rural areas. Appropriate measures will help dispose of unusable raw materials, provide part of the residents of the communities. In addition, in some areas it is possible to grow energy willow, which is a highly efficient resource for the production of pellets. As a result, some of the residents will receive additional earnings and communities receive cheaper and more ecological fuel to provide infrastructure with hot heat supply [138, p. 34].

We have developed and substantiated a model of marketing of interaction of agricultural producers for production of biofuels with a method of providing fuel and lubricants of agricultural producers and partial provision of production needs of crop and livestock industry. The directions of development of state support in the field of development of projects for the creation of biofuel industries are proposed. The need to create a model of public-private partnership in the field of scientific researches focused on biofuel production is argued.

The conducted studies confirm the importance of developing directions of improvement of production and processing of agricultural products for biofuels. Conducting large – scale modernization of sugar plants by creating complexes for biogas production, bioethanol electricity and digestive electricity will allow in the medium term to reduce the energy independence of Ukraine's economy from energy imports and create additional jobs in the APC. The use of digestat in agriculture will increase the yield of crops and reduce the cost of their production at the expense of the lower cost of this fertilizer compared to nitrogen fertilizers. Stimulating the production of solid biofuels through state subsidies to personal peasant farms to compensate for the cost of equipment in the short term reducing the consumption of natural gas by the population. Perspective for further research is to determine the potential of modernization for existing sugar and alcohol factories oriented to create the proposed complexes. It is advisable to identify ways of investing appropriate modernization and identifying a set of measures of energy oriented measures. The implementation of the proposed measures will significantly increase the level of competitiveness of agricultural products and can serve as a supplement to Ukraine's energy strategy for the period up to 2035 "Safety, energy efficiency, competitiveness".

The conducted research confirms the importance of the issue of developing models of marketing interaction of agro-industrial enterprises focused on biofuel production. Formation of own biodiesel production in rural areas, which will minimize the cost of purchasing fuels and lubricants. Carrying out large-scale modernization of agricultural enterprises by creating complexes for the production of biofuels will reduce the energy independence of Ukraine's economy from energy imports in the medium term and create additional jobs in agriculture. The use of digestate and oilseed cake in the main production of agricultural enterprises will reduce the cost of crop and livestock products. Stimulation of biofuel production through state funding of research in the field of biofuel production and compensation of interest on loans provided for the creation of appropriate biofuel structural units of agricultural formations is a necessary prerequisite for Ukraine's energy independence. . Promising for further research is to determine the potential of agriculture in the production of alternative energy sources.