

Directions of realization of the economic potential of biotechnologies at the municipal level

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Abstract. The article examines the current state and trends of development of the municipal district due to the introduction of new biotechnology. The authors have identified the main measures contributing to the socio-economic development of this industry and improving the quality of services provided in the study area.

1 Introduction

At the moment, there is no clearly defined bioenergy industry in the Russian fuel and energy complex. Despite this, Russia has great potential for the development of bioenergy [1].

The laying of gas trunk routes is carried out everywhere, there are still many settlements where gas is provided for only in the coming decades, and somewhere it is not planned to be placed at all. People use old heat sources, such as stoves and solid fuel boilers, which run on firewood. In addition, there are also boilers using wood fuel. It is for such a contingent of society that a more modern type of fuel is offered – pellets and briquettes [2-4].

We propose to consider the concept of introducing the production of pellets and briquettes in order to provide the population with a cheaper and environmentally friendly type of fuel on the example of a municipal district. This product is safe and environmentally friendly to use, economical when compared with other types of fuel and is in demand among residents of private homes and a number of enterprises.

The relevance of this topic is due to the large emissions of waste from the forest industry, which have the opportunity to be used as an energy resource during processing – pellets and briquettes. Pellets are fuel pellets obtained from various raw materials of plant origin (peat, agricultural waste and woodworking) by pressing it under high pressure. The development of this production at the municipal level will give an impetus to the development of the bioenergy industry in a particular territory.

2 Materials and Methods

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At the moment, there is no production of pellets in the Tyumen region, and the nearest enterprises are located at a remote distance.

At the moment, there are only two pellet producers in the Ural Federal District. The first one is located in the city of Serov, Sverdlovsk region, 398 km and 678 along the highway. The second one is located in the urban-type settlement of Barsovo, Surgut district, 630 km in a straight line from Tyumen, and 773 km along the highway.

With braces, the situation is different. In the Tyumen region there is one producer of fuel briquettes "Tyumen Pyrolysis Plant" and it is located in the village of Parenkina, 25 km from Tyumen. However, the plant is engaged in the manufacture of briquettes only from coal. It is the only supplier of coal briquettes in the entire territory of the Ural Federal District. There are no wood-based manufacturers.

The object of the study will be located in the Aromashevsky municipal district, namely in the southern part of the village of Aromashevo, Tyumen region.



Fig. 1. Research area

The design area of the facility is located in a favorable transport hub. The distance to the regional center is less than 300 km. The highway of regional significance 71A-301 passes through the settlement, which connects the nearest regions with the north of the Tyumen region, and the presence of the highway 71N-302 opens the way to the eastern regions of the region. The key advantage is the main highway of federal significance R-402 Tyumen-Ishim-Omsk passes 50 km from the research site.

In the process of studying the engineering infrastructure, it was revealed that this sector is equipped with all the necessary engineering facilities, such as water supply, gas supply and electricity, which significantly improves the attractiveness of this territory [5-7].

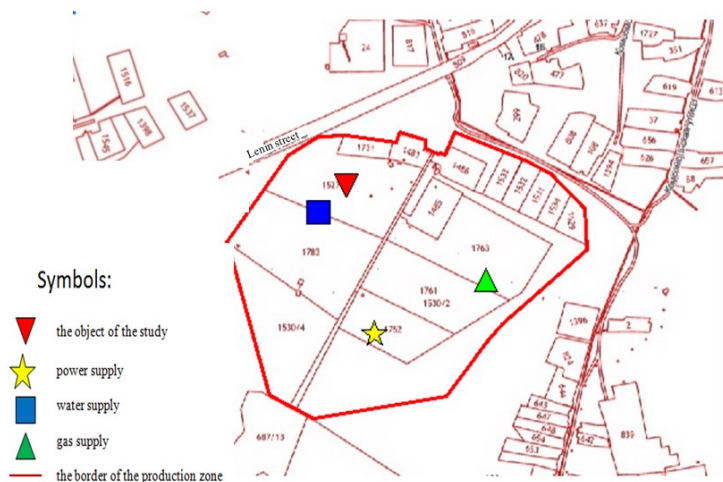


Fig. 2. Location of the engineering structure near the object of study

There are two woodworking enterprises in Aromashevo – this is the Aromashevsky forestry and an individual entrepreneur, from which you can receive woodworking materials such as sawdust, shavings, wood chips. In addition, there are many agricultural enterprises in the district that can be suppliers of grain waste, also this area is rich in peat reserves and has 8 deposits for its extraction.

Also in the area there are several agricultural enterprises capable of providing our enterprise with agricultural production waste. The main such suppliers can include the Agricultural enterprise "Sever", in addition to it in the settlement itself there is an Agricultural cooperative "Agroservice" and in some distance the cooperative "Slobodchikovsky" and other cooperatives.

From all of the above, it can be concluded that the Aromashevsky municipal district has the necessary resources and infrastructure to accommodate the production of pellets and briquettes [8-10].

3 Results and Discussion

The production process of pellets and briquettes has the same manufacturing structure, but different types of raw materials have different properties. For example, raw material in the form of wood chips and bark needs additional grinding, unlike sawdust, or raw material requires the necessary drying.

As the main production raw materials in our project, pine and birch sawdust will be used, which will be supplied from local woodworking organizations, as well as from straw, since there are many agricultural production enterprises in the district.

The reason for stopping on pine and birch sawdust is their structural characteristics. Birch has a very good specific heat capacity during combustion. Pine is inferior in this respect to birch, but not so significantly. In addition, it is possible to produce a mixed type, which allows you not to lose in quality and volume.

The reason for the inclusion of straw as a raw material is explained by the fact that there is an abundance of this material in the district, and the sale of such pellets and briquettes is several times cheaper than from sawdust.

CONTROL LINE BASED ON OGM-1.5 (SAWDUST, PEAT)

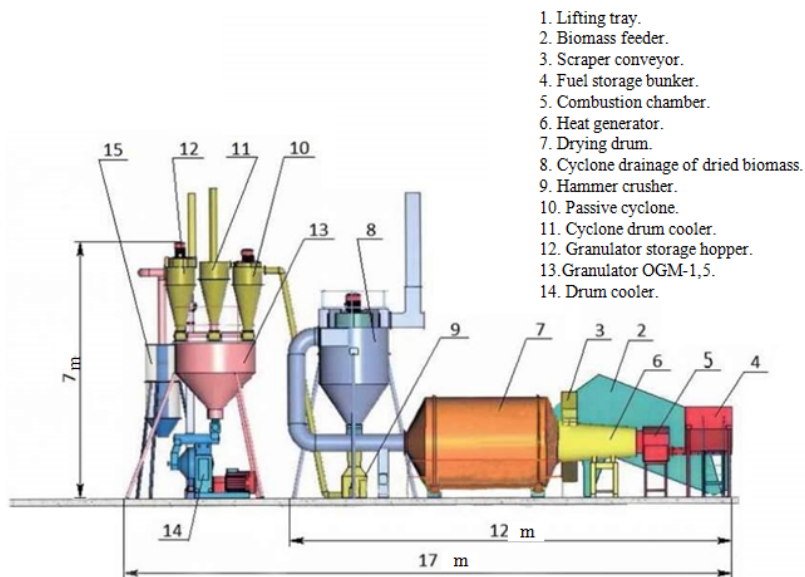


Fig. 3. The process of making pellets and briquettes

There are relatively few enterprises producing pellets and briquettes in our country and most of it is located in the Central and North-Western Federal Districts. There are only a couple of enterprises in the Ural Federal District, so the production of pellets and briquettes in the Tyumen region will be in demand.

To implement the project, it is necessary to attract financing in the form of state and municipal programs aimed at the development of production in the region and the region as a whole, as well as investors.

The main capital for the creation and development of this production is planned to be funds allocated by the State Program of the Russian Federation "Development of Industry and its competitiveness". This program is valid until 2024 and its main goal is to create personnel in key sectors of the economy, primarily in the manufacturing industry and the agro-industrial complex.

There are municipal programs in the Aromashevsky district that would help in the development of this project. Such a program includes the "Program for the Development of small and medium-sized enterprises", which can allocate part of the funds for the purchase of necessary equipment.

The missing amount of money is planned to be attracted from the Investment Fund. Since the forest infrastructure is a key area for the development of the raw material base in the Tyumen region. In this regard, investments in this area will be relevant and promising for a long time.

Table 1. Parameters of attracted financing

Indicator Value, rubles	Indicator Value, rubles
Regional budget	3 000 000
Local budget	1 500 000

Let's consider the performance indicators reflecting the assessment of quantitative characteristics from the implementation of the project, which are presented in Table 2

Table 2. Project performance indicators

Indicator Unit of measurement Value	Indicator Unit of measurement Value	Indicator Unit of measurement Value
Net present income	million rubles/year	3.3
Profitability	%	40
Internal rate of return	rub/month.	300 000
Profitability Index		1.4
Break-even point	month.	3
Payback period	month.	31
Funds raised	million rubles.	8.3
Number of new jobs	people.	19

In accordance with the rules of land use and development, the design area is located in zone P1 – Industrial Zone.

Also an important factor is the environmental factor. The design area has a sanitary protection zone that complies with regulations and legislation.

4 Conclusion

The biofuel market is only growing every year and demand will only grow in the next five years. The production of pellets and briquettes is of great importance:

- increase the attraction of new funding flows to the municipality,
- create production of pellets and briquettes at the municipal level,
- provides citizens and local businesses with eco-friendly fuel.

The project is profitable in the social and economic spheres, and has all the possibilities for implementation. The level of profitability of production and its payback period is comparable to the level of those operating on the market.

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