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Biodgas Utilization and Energy-Saving Technologies: Theoretical and Legal Foundations

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Annotation:

This article examines the theoretical and legal foundations of biogas utilization and energy-saving technologies. It highlights the importance of biogas technologies in ensuring the rational use of renewable energy sources, environmental protection, and achieving economic stability. The study analyzes the legal regulation of biogas production, storage, and use, as well as the national and international legal norms aimed at energy conservation. Particular attention is paid to issues of compliance with environmental standards, ensuring safety, and improving the investment climate in the implementation of biogas technologies. This article serves as a valuable resource for legal scholars, researchers, and practitioners.

Key words: Biogas, energy saving, renewable energy, legal regulation, environmental standards, legislation, incentives, investments, environmental safety, innovation, environmental protection, tax benefits, subsidies, international cooperation, energy efficiency, sustainable development.

Biogas and energy-saving technologies are currently considered one of the main directions of sustainable development strategies. Identifying theoretical concepts and regulating legal norms in this area are crucial for ensuring environmental protection and energy security.

Today, preserving the stability of our shared biosphere has become one of the most critical and pressing global ecological issues. Unregulated use of natural resources, the negative impact of anthropogenic factors on nature, and other reasons have caused significant disruptions to ecosystems, leading to the loss of many plant and animal species. Humanity cannot survive without nature, as it provides all essential resources. Over 8 billion people on Earth breathe oxygen, which is produced through the photosynthesis process in plants. Plants play a vital role in maintaining biosphere stability. The biosphere, as the largest ecological system, comprises numerous

ecosystems, including deserts, hills, mountains, pastures, lakes, rivers, oceans, meadows, forests, and others. The species coexisting within these ecosystems form biological diversity.

On a global scale, population growth demands meeting the needs for natural resources and agricultural products. Achieving sustainable development requires ensuring the rational use of natural resources and integrating scientific achievements and innovative technologies while forming a robust regulatory and legal framework. In Uzbekistan, legislative documents outline measures to improve living standards and quality, provide adequate housing and socio-economic conditions, construct new housing, develop modern roads and infrastructure, and ensure access to clean drinking water, electricity, and heating for the population.

Recent legislative acts and programs prioritize the rapid introduction of energy- and resource-saving technologies. This includes raising public awareness about renewable energy sources, promoting their use, and equipping farms with devices for processing livestock and poultry waste into alternative energy. Initiatives also focus on implementing modern alternative energy technologies in farming, ensuring renewable energy for greenhouses and other needs, and encouraging solar and biogas energy production and utilization. These efforts involve adopting international best practices and providing tax and customs benefits to producers and users of alternative energy.

The use of biogas in the agricultural sector, the introduction of energy-saving technologies and alternative energy sources, the further improvement of the capabilities of farms, small and medium-sized agricultural enterprises, and the promotion of modern methods of irrigation are of great importance.

The two issues mentioned above, namely the issue of electricity and water use, are of great importance for agricultural enterprises.

Rational use of energy. The share of gas fuel in the installed capacity of Uzbek power plants is 93.3%, fuel oil - 1.2%, coal - 5.2%. The structure of electricity consumption: 30.8% in the agricultural sector, 3.5% in transport, 0.3% in construction, 9.2% in utilities, and 14.3% in the population.

Water and water use. The Ministry of Agriculture and Water Resources of the Republic of Uzbekistan (surface waters), the State Committee of the Republic of Uzbekistan for Geology and Mineral Resources (groundwater) and the State Inspectorate for Geological Exploration of the Earth's Subsoil, Supervision of the Safe Conduct of Work in Industry, Mining and the Municipal Sector (groundwater and mineral waters) under the Cabinet of Ministers of the Republic of Uzbekistan are specially authorized state management bodies in the field of regulating water use within their powers. Water resources use: 88% in agriculture, 8% in household services, 1.5% in energy, 2% in industry, 0.5% in fisheries.

At the same time, according to the legislation, agricultural enterprises, i.e. farmers and peasant farms, have the right to use the following types of alternative energy sources. Including biogas plants, solar installations for hot water production, water extraction systems using solar photovoltaic stations, energy-efficient water pumps, small hydroelectric power plants, and wind energy[1].

About biogas, biogas is considered a relatively cheap ecological fuel, obtained from solid and liquid waste of livestock, poultry, as well as residues formed in plants and wastewater. By its properties, biogas is close to natural gas. Biogas, like natural gas, can be used in the following processes:

1. cooking;
2. electricity and heat energy (hot water and heating of houses);
3. as a fuel for cars.

The biogas production process produces high-quality manure from residues. Biogas can be obtained not only in farms with a large number of livestock and poultry, but also in private farms.

If several farms and private farms are located close to each other, it is more economically profitable to organize waste recycling in a centralized manner and deliver the obtained biogas to farms and farms through pipelines.

In industrial enterprises, special heating systems for biogas production are mechanized and automated. Both types of devices are widespread in the world. For example, in India, Vietnam, Nepal and other countries, small (family) biogas plants are often used. The gas obtained from them is mainly used in the cooking process. Most biogas plants are located in China - about 40 million, in India - 3.8 million, in Nepal - 20 thousand small plants. The leader in terms of absolute indicators and number of medium and large biogas plants is Germany (8 thousand). In Western Europe, half of poultry farms are heated with biogas.

A biogas plant, like any construction, requires money, effort and your strength. You should not think that the first cubic meter of biogas will bring profit, for this the plant must work stably and constantly be in your attention as a knowledgeable owner.

A farmer or smallholder farmer who decides to build a biogas plant is advised to pay attention to every detail of the planning and installation work[2].

In order for a biogas plant to operate stably, continuously and reliably, its user must know every detail of its operation. Only when these conditions are met can the following guarantees be achieved. That is, fuel, electricity, fertilizer. As well as opportunities for obtaining additional funds: selling biogas and fertilizer, increasing the productivity of agricultural crops. The process of purchasing, installing and operating a biogas plant can be divided into the following stages. First, obtaining a loan from a bank: documents required for obtaining a loan, loan terms; Second, purchasing a biogas plant, a purchase and sale agreement, a manufacturer's certificate of conformity; Third, customs clearance if purchased from abroad, a certificate of origin of goods, an invoice, a bill of lading; Fourth, installing a biogas plant, government permits, construction standards and regulations, environmental standards and regulations; Fifth, the use of biogas plants, technical safety requirements, operating rules, fire safety; Sixth, the sale of energy from biogas plants is carried out in compliance with the Law "On Electric Power", the Law "On Rational Use of Energy", and technical safety requirements.

Financial resources have been allocated to agricultural enterprises for the purchase of biogas plants, and a regulatory and legal basis has been created for the provision of tax and customs benefits.

On November 25, 2015, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 343 "On measures to encourage the construction of biogas plants in livestock and poultry farms of the Republic" was adopted. According to this regulatory and legal document, measures to encourage the construction of biogas plants in livestock and poultry farms were established[3].

Conclusion of the environmental examination. Based on the results of the state ecological expertise, a conclusion is drawn up, which will include conclusions on the feasibility or impossibility of implementing the object of the state ecological expertise, based on the preliminary and project documentation, and the Resolution of the Cabinet of Ministers.

The conclusion of the state ecological expertise is mandatory for legal entities and individuals in financing and implementing the object of the state ecological expertise. Without a positive conclusion of the state ecological expertise, financing of projects by banks and other credit organizations, as well as their implementation, is prohibited (Article 14)[4].

It should be noted that the Council of Ministers of the Republic of Karakalpakstan and regional khokimiyats, together with the Ministry of Economy, develop and approve in the established manner territorial target programs for the construction of biogas facilities. In addition, these bodies assist organizations specializing in the production of biogas facilities in the development and submission of relevant project documentation for subsequent inclusion in the program for the localization of the production of finished products, components and materials on the basis of industrial cooperation.

It was also determined that the subjects (sections) “Biogas plants. Construction and use” will be included in the curricula of relevant subjects of higher, secondary specialized and vocational educational institutions in agriculture and water management within the educational areas of “Agricultural machinery” and “Agricultural mechanization” and “Agricultural electrification and automation” directions.

The State Statistics Committee was instructed to keep records of the number of biogas plants put into operation and the volumes of products produced by them within the framework of the current forms of statistical reporting from January 1, 2016.

It was determined that electricity consumers generating electricity using renewable energy sources may connect to the electricity networks of the unified electricity system after obtaining and fulfilling the technical conditions for connection through special devices that ensure stable operation in parallel with the unified electricity system (UNES) for the supply of excess electricity.

Calculations for electricity generated using renewable energy sources, supplied by consumers to the power grids of YaEET, are made according to the tariffs set for end consumers, taking into account the costs of electricity supply enterprises for electricity transmission.

A tariff privilege in the form of exemption from customs duties is granted: In accordance with international treaties of the Republic of Uzbekistan, privileges are granted to goods imported into the customs territory by legal entities at the expense of loans (credits) issued by international financial organizations and financial organizations of foreign governments, as well as at the expense of grants. The documents required for customs clearance when purchasing a biogas plant from abroad are as follows. Customs cargo declaration, export customs cargo declaration or a document replacing it to confirm the customs value of imported goods imported with the application of privileges, transport documents (bill of lading depending on the type of transport) and documents attached to the goods (invoice). The goods must have a certificate of origin[5].

In the agricultural sector, the use of energy-efficient water pumps is also one of the urgent tasks. In order to introduce modern energy-saving technologies and equipment in water management, a number of regulatory legal acts have been adopted in the field of the use of energy-efficient water pumps.

Benefits have been established for those who use water-saving irrigation technologies. For example, another benefit has been provided to single land tax payers who use water-saving irrigation technologies in the production of agricultural products. In accordance with the amendments introduced by the above law, legal entities are exempted from paying a single land tax for a period of five years from the month in which the drip irrigation system is introduced on that part of the land plot. The main purpose of introducing this tax benefit is to encourage agricultural producers to use available water resources rationally[6].

When using water resources, are agricultural enterprises entitled to build small hydroelectric power plants? According to the legislation of the Republic of Uzbekistan, thermal power plants connected to the unified electric power system, thermal power plants, as well as power plants using renewable energy sources may be state or private property. According to the legislation, legal entities and

individuals can generate electricity for their own use. Legal entities and individuals generating electricity for their own use are prohibited from connecting electrical devices that generate electricity to the regional power grid. The sale of electricity generated by legal entities and individuals for their own use to other legal entities and individuals may be carried out through their own electricity networks in accordance with the procedure established by law.

The theoretical and legal foundations of biogas use and energy-saving technologies are of great importance in protecting the environment, ensuring economic stability and developing renewable energy sources. Biogas technologies are considered an effective solution not only for the rational use of natural resources, but also for combating climate change.

This study analyzed the legal foundations of biogas use, and also indicated directions for improving legislation by integrating it with energy-saving technologies. In particular, it emphasized the need to strengthen legal norms aimed at ensuring environmental standards and industrial safety in the biogas production process.

Based on the analysis conducted, the following conclusions were drawn:

Firstly, it is necessary to harmonize national and international regulatory documents regulating the use of biogas, and introduce new legal mechanisms taking into account best practices.

Secondly, it is necessary to strengthen the incentive system through tax incentives and subsidies for entrepreneurs and organizations implementing biogas technologies.

Thirdly, it is necessary to provide the population and business entities with information on the advantages and legal opportunities of using biogas, thereby forming an energy-saving and environmental culture in society.

In addition, it is proposed to further analyze the legal framework for the practical development of the energy-saving potential of biogas technologies and strengthen international cooperation in this area. The results of this study will serve to develop practical recommendations for improving legislation and introducing innovative technologies.

LIST OF MATERIALS USED AND RECOMMENDED

1. Resolution "On measures to encourage the construction of biogas plants in livestock and poultry farms of the Republic" (No. 343 of 25.11.2015), the State Standard of the Republic of Uzbekistan "Biogas plants. General technical conditions" has been implemented by the "Uzstandard" agency (O`zDSt 2798:2013). PP-5063 "On measures to develop renewable and hydrogen energy in the Republic of Uzbekistan", Resolution of the Republic of Uzbekistan dated 21.05.2019 Law O'RQ-539 "On the use of renewable energy sources" (adopted by the Legislative Chamber on 04.16.2019, approved by the Senate on 05.03.2019).
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