

**BIOGAS ENERGY IS A RELIABLE AND ECONOMICAL ALTERNATIVE TO  
NATURAL GAS**

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Green technologies are actively developing in Uzbekistan, especially in the field of biogas. The country's Green Strategy until 2030, aimed at improving energy efficiency and reducing greenhouse gas emissions, while the country is actively implementing projects in the field of renewable energy and waste management.

Key points of development of biogas and green technologies:

"Green" strategy: Uzbekistan strives for a "green" economy (2019-2030), which includes improving energy efficiency, rational use of resources and reducing emissions, where biogas plays an important role.

The Yasil Macon Program: A large-scale tree planting program until 2030, aimed at restoring the environment and increasing green spaces. Biogas produced from agricultural and household waste is a promising area for reducing dependence on fossil fuels, which dominate the country's energy mix. In general, Uzbekistan is making significant steps towards sustainable development, using international experience and technologies to implement biogas solutions and other "green" initiatives.

Green technologies for producing fuel from biogas rely on its purification and conversion into high-quality fuels such as biomethane (compressed or liquefied), which can be used in transportation and for injection into gas networks. These technologies also enable the production of "green" hydrogen using biogas as a feedstock, reducing CO<sub>2</sub> emissions and providing a renewable energy source. The main purification methods include membrane separation, absorption (water, amine, and carbon), and cryogenic separation, removing CO<sub>2</sub>, H<sub>2</sub>S, and moisture to produce pure methane (CH<sub>4</sub>). Stages of obtaining fuel from biogas Anaerobic digestion (production of raw biogas): Organic waste (manure, sewage, food waste) is decomposed by bacteria without oxygen, producing biogas (methane + CO<sub>2</sub> + impurities). Upgrading: Removal of impurities to produce biomethane (mix of technologies): Membrane separation: Selective passage of methane through membranes. Water/amine absorption: CO<sub>2</sub> and H<sub>2</sub>S dissolve in liquid. Adsorption on activated carbon: Adhesion of impurities to the surface of carbon.

Cryogenic separation: Cooling to separate gases.

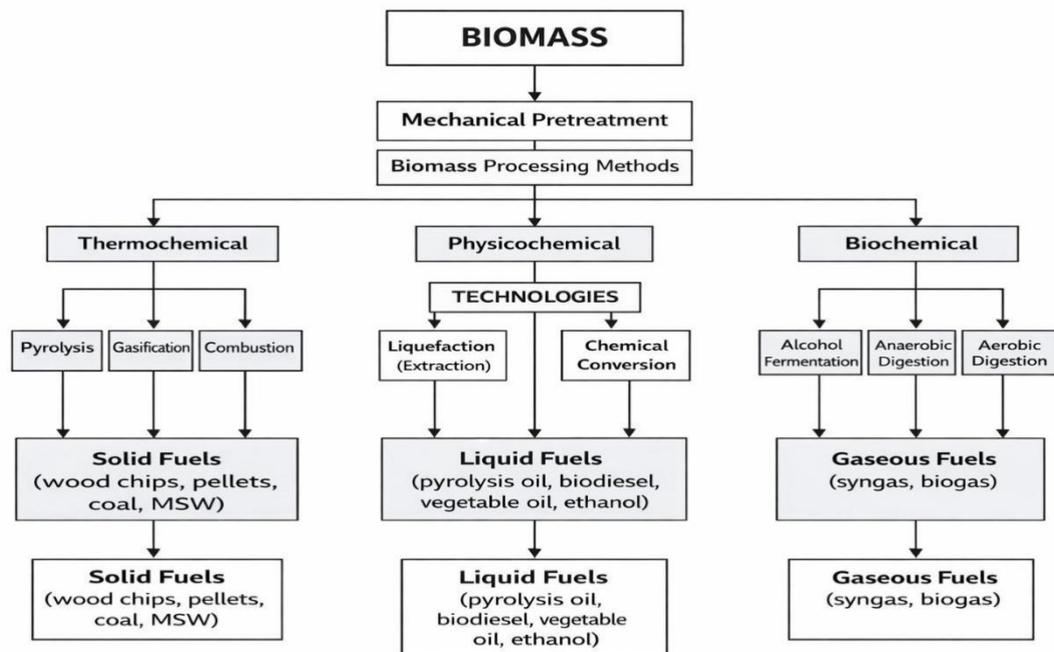
Final product: Biomethane (Bio-CNG/Bio-LNG): Purified biogas, compressed (CNG) or liquefied (LNG), as an analogue of natural gas. Heat/Electricity: Direct combustion to produce energy.

Hydrogen feedstock: Production of “green” hydrogen using biogas (methane).

Benefits of green fuel from biogas Emission reduction: Replacement of fossil fuels, reduction of methane from waste. Renewability: Constant source of raw materials (waste).

Energy Security: Local Fuel Production. Waste Management: Solving the Problem of Organic Waste Disposal. Technological features The process is effective, but requires investment in anaerobic digestion units and treatment systems. Technological advances are making biomethane increasingly competitive in the market.

Biogas energy is a reliable and economical alternative to mainline natural gas and centralized electricity supply. The use of waste from animal husbandry, crop production, food and oil and gas industries, as well as wastewater for biogas production makes this type of energy not only a new type of energy, but also an assistant in the disposal of various types of waste. Currently, the task of developing and implementing biogas devices for gas supply systems is urgent. Biogas is a mixture of gases consisting mainly of methane and carbon dioxide produced during the methane fermentation of organic matter. In our country and around the world, special attention is paid to the use of alternative forms of energy, in particular energy from biomass.



This is due to population growth, driven by the growing demand for energy. Installations using alternative forms of energy are being rapidly introduced all over the world, but the success of the introduction of alternative energy sources mainly depends on location and climate. Taking into account the climatic and other conditions, we recommend implementing the following types of biogas plants in Uzbekistan. A distinctive feature of our proposed metanktenk biogas plant, designed for medium and large farms, is the presence of a special container for the preparation of raw materials, from where it is supplied using a compressor to the loading hopper, and then using compressed biogas to the reactor of the plant. Part of the biogas produced is used to operate the heating system. The installation is equipped with an automatic biogas extraction system and a gas tank for its storage.



## REFERENCES

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