

## Biogas as an Alternative Gas Supply Source for Independent Consumers in Russia

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### Abstract

The paper discusses prospects of green gas production in Russia for gas supply of local consumers.

### Background

Gas supply for local consumers is one of the priorities of the regional policy of JSC Gazprom. In accordance with the Concept of JSC Gazprom Participation in Local Gas Supply, the company diversifies its approach to each given region depending on local natural gas resources and developing of already exploited fields. It also looks at the opportunity of supplying the region with alternative means, such as LNG, CNG and LPG.

This concept divides the regions into groups depending on the level of their gas grid development state and plans the gas supply of every region. The most attention is paid to gas supply of small and remote towns. Since Russia has large number of remote towns with low population density, the supplying of gas requires responsive approach and individual solutions. JSC Gazprom does not consider the autonomous gas supply as an alternative to network gas. It is considered as an additional option in the regions, where gas grid construction is not feasible or technically impossible.

Autonomous gas supply allows upgrade of energy security, as well as social and economic development.

### Autonomous gas supply

Alongside with the traditional means such as LNG, CNG and LPG, biogas is also an option. Biogas – is the product of anaerobic fermentation, typically consisting of 50-87% methane, 13-50% of carbon dioxide and minor amounts of hydrogen sulfide, ammonia, hydrogen and other.

Since biogas is 2/3s methane, 1 cm of biogas is equivalent 1.5-2.2 kWh of electric power and 2.8-4.1 kWh of thermal energy or 1 liter of gasoline.

The stock for biogas could be solid and liquid waste of the agricultural complex, wastewater, household waste, wood processing residue.

Biogas is usually used to generate power and heat. However, it can also be upgraded to biomethane, which is the full equivalent of methane. One of the most perspective ways to use biogas could be its use as motor fuel, which is currently spreading worldwide.

Biogas for autonomous supply has its advantages. First, it has a positive environmental effect, since it minimizes the impact. Secondly, biogas development could be considered as support for agricultural producers, since it helps process agricultural waste and produce inexpensive organic fertilizer. Thirdly, it gives the chance to supply the remote consumers with natural gas, which makes it possible to develop new rural territories. Among other advantages, biogas gives the opportunity to produce a number of energy products simultaneously – gas, motor fuel, heat and power.

Creation of local biogas-powered power generation plants, which are independent from the large-scale power generation, could take a share from the conventional natural gas in the fuel mix of the country.

Due to its large territory, Russia has significant potential in biogas production – up 131 bcm p.a.<sup>1</sup>

Table 1 demonstrates the biogas production potential, based on the data of the Institute of Energy Strategy of The Ministry of Energy

**Table 1** – Biogas production potential in Russia

	Organics mln tons*	Biogas bln cm	Total GW
Crop production	147	94,8	84,4
Agro industrial complex (processing)	14	12,8	11,4
Wastewater	4,9	2,6	2,3
Household waste	16	20,8	18,5
Total		131,0	117,7

Among the regions, the biggest resource base is located in three Federal Districts: South, Volga and Central. Fig. 1 demonstrates the biogas potential breakdown.

Given the peculiarity of gas supply in Russia, mainly large amounts of remote zones, new solutions are required. This is the reason why biogas production is one the most perspective ways of autonomous gas supply in Russia.

The autonomous gas supply of industrial plants, social enterprise and towns with alternative gas sources is an attractive field of investment with, occasionally, acceptable payback periods. Alternative gas supply can solve the energy issue of remote regions, which are located in harsh climatic environment and complex topography.

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<sup>1</sup> Karasevich V., Albul A., Akopova G. Biogas as a complex solution of economic and ecological tasks. // Scientific review of Russian Gas Society. - № 2. – 2014 – p. 147-152.



Fig. 1. Biogas potential breakdown (other than wood processing and peat)

## Conclusion

Use of biogas as an alternative mean of autonomous gas supply is an important government task, the solving of which will help supply remote objects of Russia with green energy. It will help solve a number of environmental issues and will support rural area development, as well as waste processing issues.